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## Illustrations.

The Queen Victoria Memorial Hall, Calcutta. Sir William Emerson, F.R.I.B.A., Architect.

Messrs. Selfridge's Premises, Oxford-street. Mr. R. Frank Atkinson, F.R.I.B.A., Architect.

Apse, S. Stefano, Bologna } Drawn by Mr. W. Curtis
Well Head, Bologna } Green, A.R.I.B.A.

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### *A Plebiscite on the Registration of Architects.*

IS the protracted discussion of this subject for a good many years back has recently been revived by letters published and papers reported in our columns, we have thought it would be well to make an attempt to obtain a general expression of opinion from the whole architectural profession on the question whether it is desirable that architecture should become a profession closed by law to all but those who are officially registered as architects.

With this object, a copy of this issue of the *Builder* will be posted on the 5th inst. to every architect in the kingdom; those who are already regular subscribers to or purchasers of this journal will understand that a second copy is sent to them (free of charge) merely to ensure that everyone receives it, as we do not know the names of our purchasers except in the case of those who subscribe direct to the *Builder* office. On the same day everyone who has received the paper will receive also a "reply" postcard with three questions on it, which we request them to post to us as soon as convenient with their vote marked on it in the manner suggested on the card.* We shall then be in a position to form some idea of the balance of opinion on the subject in the profession, and its relative value. The result (as far as we can obtain it) will be stated in our columns.

A few remarks on the last form of the Registration Bill (July 25, 1906) may be useful. It starts with the preamble—"Whereas it is expedient that persons requiring professional aid in architecture should be enabled to distinguish qualified from un-qualified practitioners"; a preamble which, on abstract principles, we certainly cannot dissent from, though the words "qualified" and "unqualified" may be capable of very varied interpretation, and it is possible that a "qualified" architect may design very unqualified architecture. The means proposed for securing this object are, put briefly, as follows:—A General Council is to be created, to be styled "The General Council of Architectural Education and Registration of the United Kingdom," and to be composed of five persons nominated from time to time by His Majesty, with the advice of his Privy Council (three for England and Wales, one for Scotland, and one for Ireland), and twenty-five architects chosen from various architectural bodies named; the principle of selection is very fair, and there is nothing to criticise in it.

This body is to be the official authority under which architects are to be registered. There is a great deal of space occupied by details of administration, which we may pass over; the main point is as to who are to be registered. Section 19 provides that everyone who at the time of the passing of the Act is a Fellow or Associate of the Institute of Architects, or a Member of the Society of Architects, or a professional member of any architectural society affiliated with the Institute of Architects, shall be entitled to be registered under the Act on the payment of such registration fee as may be fixed by the General Council, and of an annual renewal fee of 1*l*. For those who are not so circumstanced provision is made in the following subsection:—

"Any person who can prove to the satisfaction of the General Council that he was actually practising architecture prior to [a date to be fixed], and is still so practising, or who has served as apprentice, assistant, or practitioner in architecture, all or either, for twelve years in the aggregate, after having attained the age of fifteen years prior to the *passing of this Act*, shall, on payment of a fee to be fixed by the General Council, and pending the fixing of the fee by the General Council a fee of *five pounds*, be entitled to be registered on producing to the registrar of the branch council for England, Ireland, or Scotland, a declaration according to the form in Schedule (B) or (C) to this Act, signed by him, or upon transmitting to such registrar information of his name and address, and enclosing such declaration as aforesaid."

There follow some further provisions for enabling the architectural societies named in Schedule A of the Bill to forward lists of such architects as they may certify to be entitled to registration under the provisions of the Act. We presume that the root idea in naming this period of twelve years' practice is that a man who has been able to keep up a practice for that period must have adequate capability as an architect; which is a probable, though, we fear, not quite a necessary consequence. The provision for an applicant for admission not already in practice is as follows:—

"An applicant for admission after the *passing of this Act* must be not less than twenty-one years of age, and must, except in cases hereinbefore and hereinafter mentioned, have served as apprentice for not less than three years with a registered practitioner or practitioners, and have passed such examination or examinations as the General Council shall authorise."

That is the best provision in the Bill, and could have nothing but a good effect.

Passing over further less important details which we have not space to notice here, we will come to what may be called the "preventive" clause (21):—

"From and after [a date to be fixed] a person shall not be entitled to take or use the name or title of architect (either alone or in combination with any other word or words, save only that of naval architect), or any name, title, or description implying that he is registered under this Act, unless he be so registered."

That precludes the use of the title "architect" (as it is no doubt often used now) by persons who have no qualification for adopting it. It will not,

* Anyone who receives this paper and does not receive the "reply" postcard is requested to communicate with the Publisher of the *Builder*.

however, prevent such persons from continuing to act as architects in carrying out buildings, if people choose to employ them; nor, as far as we can see, would it prevent anyone describing himself, if he liked, as a "designer of buildings"; but it deprives him of the handle afforded by the prestige attaching to the name "architect." And any eminent and well-known architect who disapproved of the Act and did not choose to be registered under it would only have to paint out the word "architect" on his office door; those who knew him by reputation would come to him just the same. There is however the further important provision under sect. 27:—

"After [a date to be named] no person shall be entitled to recover any charge in any court of law for any professional services rendered as architect unless he shall prove to the court that he is registered under this Act."

It is noticeable that under this and under another head in the Bill the framers of it have felt obliged to insert a saving clause: "Nothing in this section shall be held to prejudice the right of members of the Institution of Civil Engineers or of the Surveyors' Institution" to do what is forbidden in the case of architects. One of these exceptions in favour of engineers and surveyors occurs in the section (28) which makes it obligatory on public bodies to employ registered architects for any office in which they may be required "to prepare, examine, approve, or pass, plans of buildings and their constructional or sanitary arrangement"; so that, by inference, engineers and surveyors, members of those two bodies, can act as architects to public bodies without coming under the provisions of the Act; hardly a position, we should think, that most architects would wish to support. Moreover, if this Bill ever comes to consideration in a Parliamentary Committee, we should think that these clauses excepting the engineers and surveyors would be likely to raise a question as to why architects were either to be protected or menaced by law when engineers and surveyors were not.

It is to be observed that there is no attempt made in the Bill to give any legal definition of an "Architect"; it seems to concern itself with the *name* rather than with the function of architect. If a man chose to think that his friend who was an engineer could carry out a house for him just as well as an architect, and commissioned him to do so, could the Act prevent that? Could it have prevented the late Lord Grimthorpe from building a parsonage for a friend? Apparently not.

The Bill as drawn up, however, might no doubt have a wholesome effect in checking the assumption of the title and functions of architect by incompetent persons, for the present and future generations (whom we must also think of). As we have already said (see our leading article under date January 9), we do not think it can have any influence in improving the *art* of architecture, which is the essential quality in architecture; and although some of its supporters profess their belief in its beneficial influence in that sense, we take it that the real motive with most of the supporters of the measure is that of preventing the interference of unqualified persons in their professional work. That is a matter of practical importance, no doubt, to men making their living by the practice of architecture; and we recognise that while the reasons in favour of the measure are practical ones, the objections to it are mainly objections of sentiment. If, therefore, there seems to be a preponderating wish for such a measure in the profession, and if it ever comes before Parliament, we shall not endeavour to oppose it, seeing that it may be a practical benefit to many (though not, we think, to the extent they expect from it), and will do no actual or definable injury to those who are opposed to it.

The last "if," however, is rather a large one. We have very great doubts, for various reasons, whether Parliament would ever pass such an Act; and those doubts are shared by people outside the architectural profession, who have no prejudices in the matter, but who have some knowledge of the temper and habitudes of the House of Commons. And for this reason we would suggest to the advocates of Registration that it would be well, in their own interests, to consider seriously whether they are not in fact working for something which they have not much chance of obtaining; whether it would not be wiser (in their own interests again) to seek the same end in a way that is open to them all, viz., by a general adherence to their central body the Institute. We quote what was said by the Chairman of the Institute Registration Committee, Mr. Edwin T. Hall, at the meeting of the Committee on April 3, 1906:—

"The object was to collect into the Royal Institute of British Architects all qualified architects, and then to apply to Parliament in order to give them a legal diploma and legal titles. When this had been brought about it was decided, and it was recommended, that in future admission should only be by a compulsory training upon lines to be settled by the Institute, and by compulsory examinations. When this was done, with all the accompanying publicity which of necessity would arise from it, it was felt that those who were outside, the unqualified men, might be left alone. People might go to them just as they now go to medical quacks, but in no other sense would they be, in the course of a few years, a factor that need be taken into account. The advantages of this scheme were generally felt to be that instead of giving titles to unqualified men, and so to that extent lowering the immediate prestige and status of the profession for a time, they could proceed at once on an upward course."

That is surely a very reasonable and sensible position, and worth the serious consideration of the profession. But we do not recommend attention to it merely on that ground, but also because it represents what is within the power of the architects to bring about *by their own action*, and registration by Act of Parliament is not. In working for Statutory Registration they are at the mercy of Parliament, which may prove permanently recusant. In acting with and through the Institute they have the matter entirely in their own hands. Surely that is a point worth considering. We have for many years earnestly desired to see the architectural profession dropping their differences, acting on the principle that "union is strength," and considering it a point of honour to belong to and to support their central representative body. By doing so we believe they would indirectly obtain all the advantages which they are expecting from a Registration Bill which Parliament, after all, may never consent to pass.

## THE GENERAL POST OFFICE EXTENSION.

AS the main structural work of the General Post Office extension is now virtually completed the time is opportune for a general description of the new building, together with particulars relative to some of the more noteworthy details embodied.

The building in question, as most of our readers probably know, occupies the greater part of the site where formerly stood Christ's Hospital. One block faces King Edward-street, on the opposite side of which are older portions of the Post Office. The other block is almost hidden from sight by surrounding structures, save for a length of about 100 ft., where the façade abuts on Newgate-street.

So far as actual construction is concerned, the building is executed entirely in reinforced concrete (Hennebique system of "ferro-concrete"), the architect being Sir Henry Tanner, acting for H.M. Office of Works, and the consulting engineers Messrs. L. G. Mouchel & Partners, commissioned in that capacity by the Treasury.

In respect of floor area, although this is 15 acres in all, the Post Office extension does not represent the most extensive reinforced concrete building constructed in this country, that distinction belonging to the dock warehouses in Manchester. The construction is less remarkable also in point of exceptional strength than some other reinforced concrete buildings, such as the North-Eastern Railway Goods Station in Newcastle, and various industrial establishments elsewhere.

But the additional accommodation for the Post Office deserves special notice for the reason that it is the first example of reinforced concrete construction on an important scale undertaken in the metropolis by one of the great Government departments. Therefore the building stands as an authoritative demonstration of the fact that the new system of construction need no longer be regarded as an experiment in any sense of the term. The enlightened policy displayed by H.M. Office of Works in thus adopting reinforced concrete is particularly commendable, and it is to be hoped that one result will be the abandonment of the vexatious restrictions hitherto placed on the employment of the same material by the Local Government Board. The new building certainly constitutes a valuable object-lesson for the benefit of architects, and demonstrates also the advantages which can be secured by reinforced concrete construction when unfettered by regulations such as those contained in the London Building Act and codes of equally obsolete character.

As shown by Fig. 1, the Post Office extension consists of two large blocks, described as the Public Office and the Sorting Office, rising from a two-story underground structure which extends beneath the loading yard between the offices mentioned. The Public Office is 201 ft. long by 60 ft. wide by 85 ft.

high above ground level, or 110 ft. high from the basement floor to the flat roof. This block has seven stories in all, the heights being as follows :—

| | ft. | in. | | ft. | in. |
|---|---|---|---|---|---|
| Basement ..... | 13 | 6 | First floor .... | 14 | 6 |
| Sub-ground floor | 15 | 6 | Second floor .... | 14 | 0 |
| Ground floor .. | 25 | 0 | Third floor .... | 14 | 0 |
| | | | Fourth floor.... | 13 | 6 |

The Sorting Office is 312 ft. long by 185 ft. wide by 70 ft. high above ground level, or 100 ft. 6 in. from the basement floor to the flat roof. This block includes six floors, the heights of the several stories being :—

| | ft. | in. | | ft. | in. |
|---|---|---|---|---|---|
| Basement ..... | 13 | 6 | First floor .... | 18 | 0 |
| Sub-ground floor | 16 | 6 | Second floor.... | 18 | 0 |
| Ground floor .. | 20 | 6 | Third floor .... | 14 | 0 |

The Loading Yard between the two offices, measuring 150 ft. long by 50 ft. wide, is covered by a glazed roof carried on steel principals, and the loading platform at the western end of the Sorting Office is sheltered by the upper part of the building, which projects as a huge cantilever 12 ft. 6 in. beyond the supporting columns. Some idea of the magnitude of the works is afforded by the facts that the area covered is nearly 2 acres, and that the contents of the building are about 8,000,000 cub. ft.

Fig. 2 is a diagram in perspective prepared from the working drawings for the purpose of explaining the general nature of the framed construction. The underground portion has a continuous foundation slab 5 in. thick, from which rise thin retaining walls stiffened by counterforts, these elements of the construction being in monolithic connexion throughout, forming a chamber structurally analogous to a reservoir with the capacity of about 15 million gallons. Inside this chamber are the footings of columns which rise to the top of the superstructure and support the dead weight

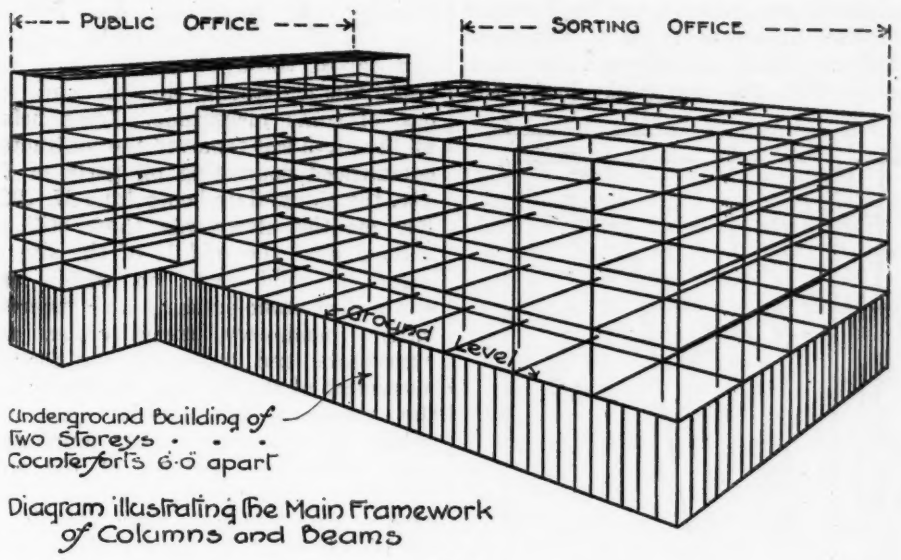



*Fig.* 2.

of wall lintels, main beams, secondary beams, wall slabs, floors, and the flat roof, as well as the loads carried by those portions of the building. The exterior columns are connected with the retaining wall at sub-ground floor and ground floor levels by reinforced concrete arches acting as intermediate struts to the counterforts of the retaining wall, and the same columns are, of course, in monolithic connexion with the general foundation slab. All interior columns are connected at basement floor level by the foundation slab, and at sub-ground floor and ground floor levels by the floor beams and slabs.

Consequently the resistance of the underground chamber is represented not merely by the strength of the thin floor slab and retaining walls, but by the collective strength of all the vertical and horizontal members below ground level. In fact, the subterranean building, which we have likened to a reservoir, is effectively braced in every direction at three different levels, and so is far stronger than any existing type of reinforced concrete reservoir.

Above ground level the main columns, wall lintels, floor beams, and roof beams form a complete cage for each block very much akin to the steel cage employed in masonry buildings, but differing in the important respect that the frame is constructed without a single joint by monolithic connexion of the concrete. The rigidity thereby secured is increased by the addition of wall, floor, and roof slabs, also in monolithic connexion with the main columns, main beams, and secondary beam, and in the case of floors and roofs moulded so as to be capable of continuous beam action.

Of course, the columns and beams are of

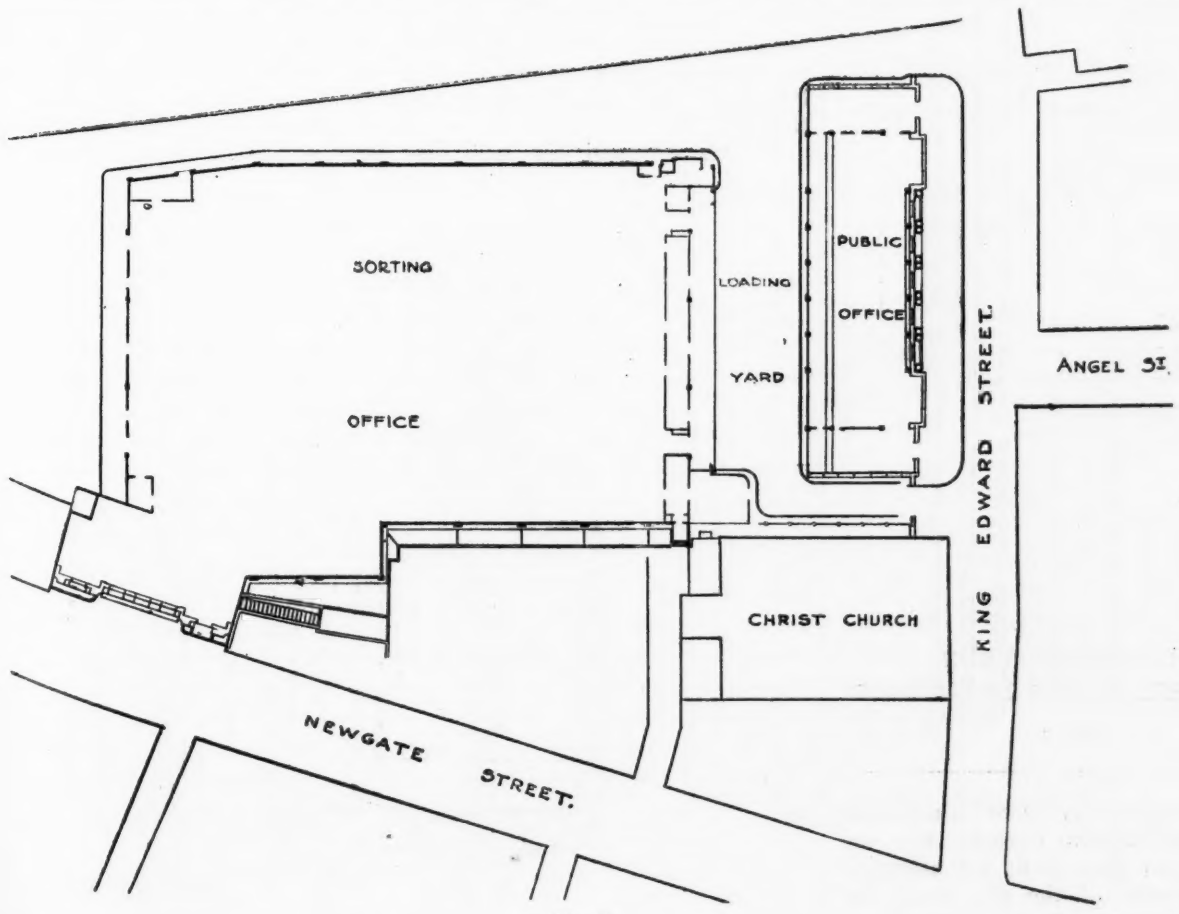
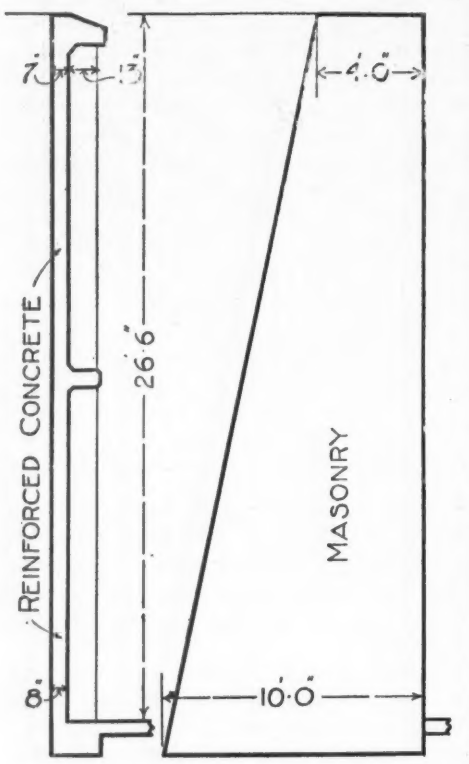



*Fig.* 1.

various shapes and sizes, and the building comprises numerous types of structural details to which no reference has been made. Still, the foregoing description




COMPARISON OF RETAINING WALLS

*Fig. 3.*

taken together with Fig. 2 conveys a sufficiently accurate notion of the general principle of construction embodied in the Post Office extension.

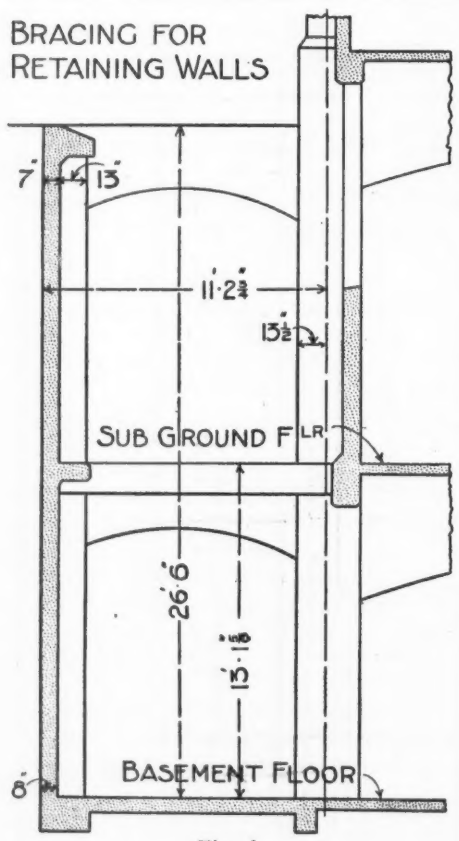



*Fig. 4.*

Active operations were commenced by the contractors towards the end of 1906, the first thing for attention after clearance of the site being the great excavation for the underground building. As something like 500,000 cub. yds. of material had to be removed and carted through the streets, it will readily be understood that the work was one of some magnitude. Long before all the earth was removed the contractors commenced concreting on parts of the site, the actual date being June 27, 1907. For months afterwards there still remained near the middle of the site an island of solid earth on which were established stone-crushing and concrete-mixing machinery, steam cranes and excavators, and tramway lines for the movement of the hoisting machinery and the transport of material generally. While the retaining walls, foundation slab, and other portions of the substructure were being moulded, the excavators continued their attack on the island, which ultimately disappeared soon after the Public Office block began to rise above ground level.

To give anything like a complete description of the building would obviously be impossible in the present article. Therefore we confine attention to some account of various structural features and details which are of exceptional interest.

Fig. 3 contains a typical section of the retaining wall and the section of an ordinary retaining wall proportioned in accordance with customary rules. In the case of the reinforced concrete wall the thickness of the vertical slab is only 7 in. at the top and 8 in. at the bottom, the slab being stiffened by vertical ribs spaced 6 ft. apart, and measuring 8 in. wide by 16 in. deep. An ordinary retaining wall of the same height, with the batter of 1 in 5, would be 4 ft. thick at the top and 10 ft. thick at the bottom. Taking these dimensions for the purpose of comparison, we find that the saving of floor space effected by reinforced concrete per foot run is $9\frac{1}{3}$ sq. ft. Calling this $9\frac{1}{4}$ sq. ft. to allow for the projecting counterforts, the total area saved by the use of reinforced concrete for the length of the retaining walls around the Post Office site is estimated at nearly 15,000 sq. ft.

Bearing in mind the fact that the height of the retaining wall is 28 ft. to more than 30 ft., the thicknesses stated above seem to be very small. But the slabs, considered as vertical beams, are of ample thickness for any probable thrust; the counterforts, also acting as vertical beams, are fixed at top and bottom to the floors, and are stayed at every main pier by two arched struts as before mentioned. The general result is that represented diagrammatically in Fig. 4, which serves the double purpose of justifying the design and of illustrating the co-operation established between adjoining members in reinforced concrete construction.

Among the columns in the new building there are members of various sizes and

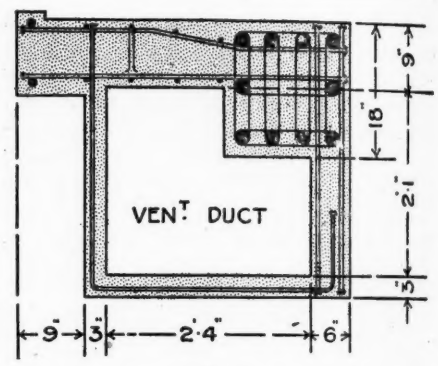



*Fig. 6.*

types, some extending from the basement to the roof, and others supported by floor or wall beams. As a general rule, the columns are solid, but a few of them are of the hollow box type, and others are combined with ventilation ducts and vertical shoots for letter-bags. The nature of the reinforcement is illustrated in Fig. 5, containing sections of solid and hollow columns. Each of the latter is designed for the load of 800 tons, the sides of the columns being 9 in. thick. The small section at the top of this drawing shows the sheet-iron casing which has been placed around some of the columns to protect them from mechanical injury in the lower portion of the building. Fig. 6 is a section

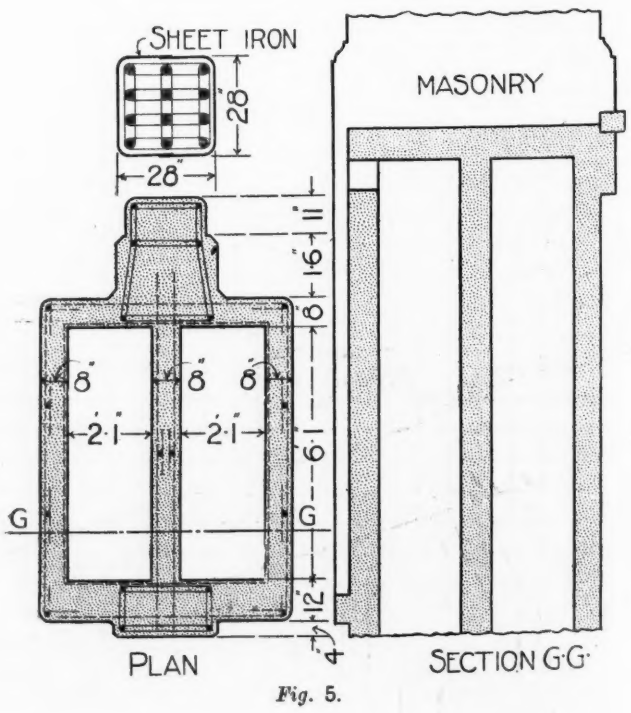



*Fig. 5.*

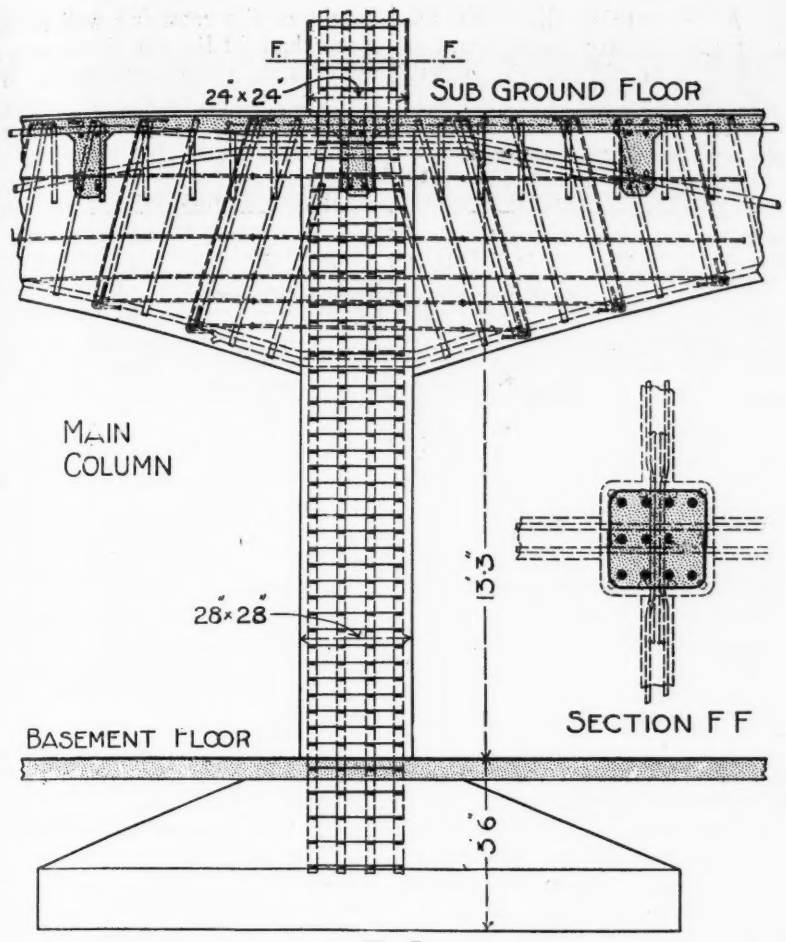



*Fig. 7.*

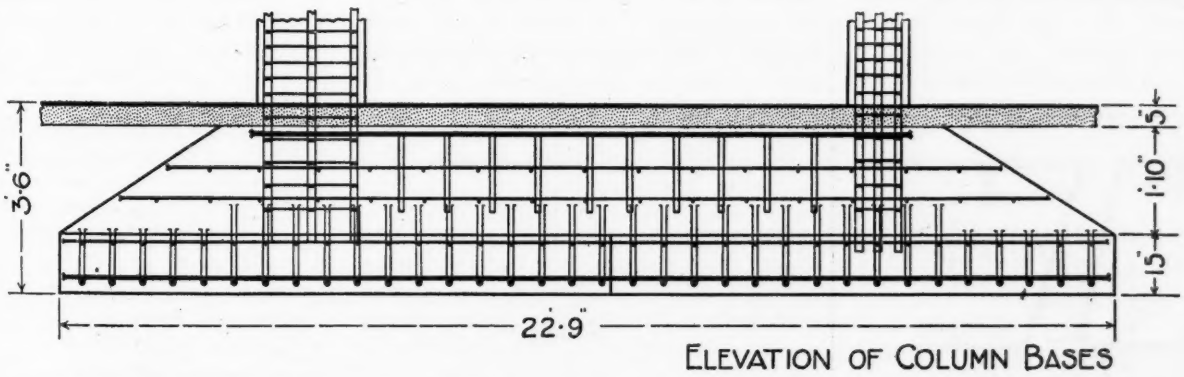
illustrating the combination of cclumns and ventilation ducts.

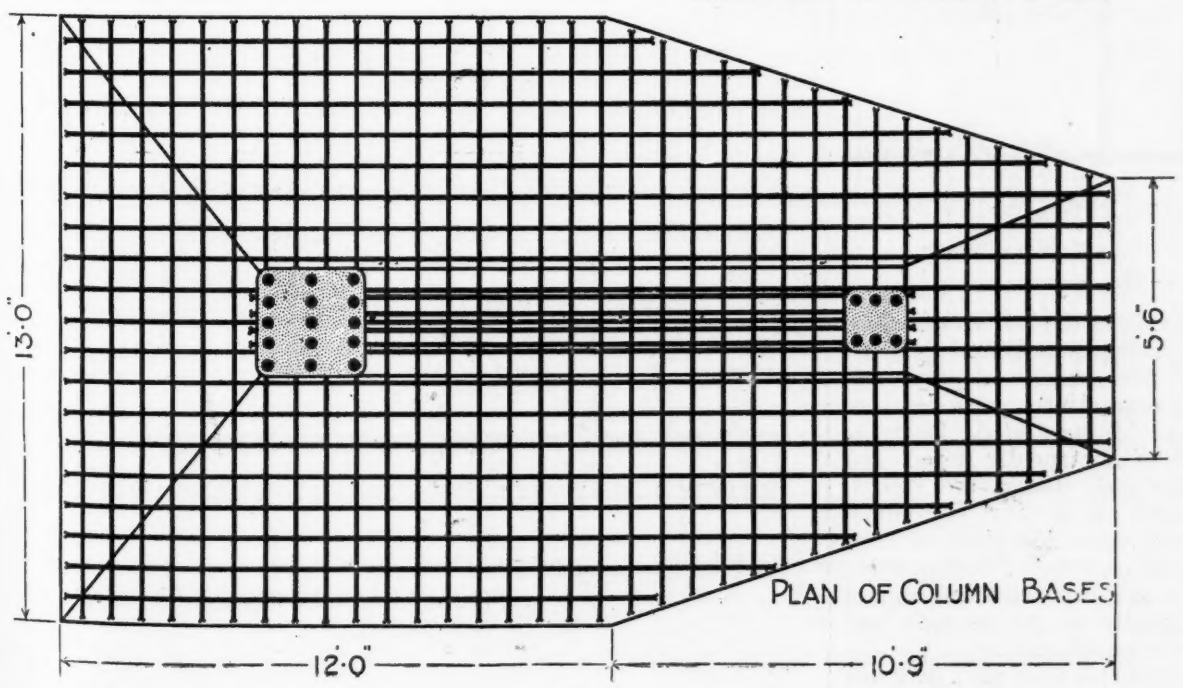
To take an example which emphasises the great utility and advantage of reinforced concrete, we draw attention to the main columns of the Sorting Office. These members extend in graduated dimensions up to the roof of the building. In the basement, where the load reaches the total of 800 tons per column, the sectional dimensions of the concrete are only 28 in. by 28 in., the load per square inch on the reinforced concrete being more than one ton. A compound stanchion built up of steel would measure from 20 in. to 24 in. square for equal loading, and when covered with fire-resisting material its external dimensions would not be less than those of the reinforced concrete column.

Fig. 7 includes sections of a typical main column in the basement, and shows the proportions of the base. This base measures 13 ft. 6 in. square, and may usefully be contrasted with a footing as commonly designed in plain concrete for steel columns and masonry piers.

Although the superficial area of the reinforced concrete footing is about the same as that which would be adopted for plain concrete, its thickness is only 3 ft., as against 20 ft., the latter being a thickness not infrequently encountered in ordinary practice for loads of the magnitude now in question. The economy attained by the addition of reinforcement is here very evident, the combined material being able to withstand tensile and shearing stresses without requiring any great bulk of concrete, whose weight in excessively thick foundations has the effect of defeating its own object by adding useless weight to the loads transmitted from above.

Column bases of the same character are to be found throughout the building,



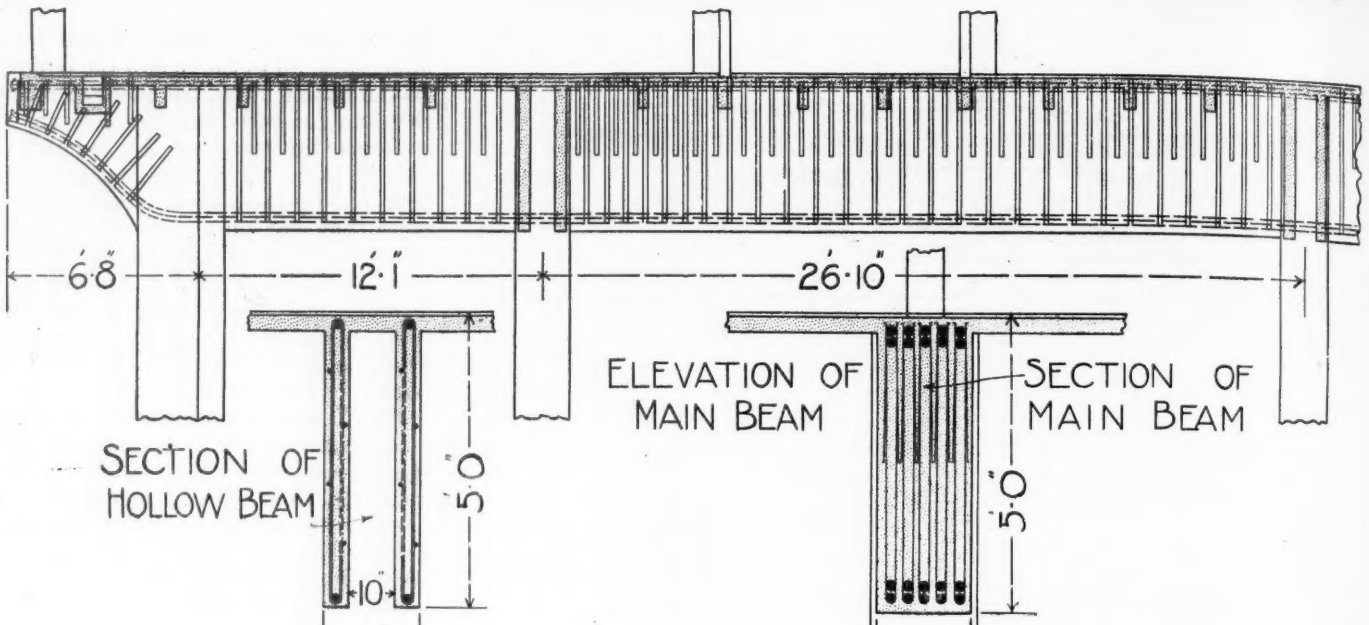



*Fig.* 9.

their dimensions varying from 4 ft. to 15 ft. square, but in no case is the bottom of the base more than 4 ft. below basement floor level, the general depth being 3 ft. 1 in. below the underside of the 5-in. foundation slab.

Fig. 7 aso shows the connexions between the columns and the main and secondary beams of the sub-ground floor, and Fig. 8 represents a typical base for two columns.

The columns are disposed in longitudinal and transverse rows through the walls and interior of the building, their spacing involving beam spans up to 50 ft. between supports. In consequence, many of the wall and floor beams are of

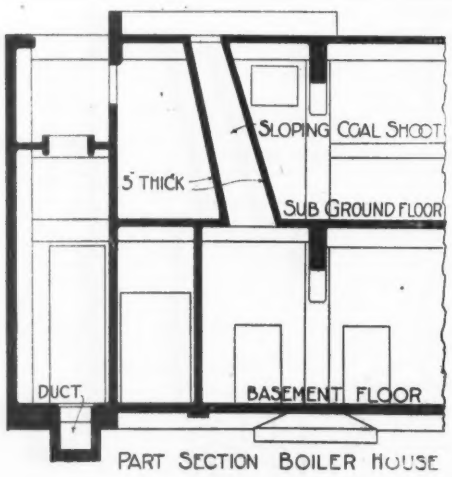



*Fig.* 10.

exceptional dimensions and spans, which would be quite possible in steelwork, but too costly for general adoption and involving inconveniently great depth of the members. In most of the floors the beams are of rectangular form, and some of the main beams are arched, but being employed, as usual, in conjunction with continuous floor slabs, all such members really constitute T-beams, where the slabs act as compression flanges, and add very greatly to the strength and rigidity of the construction.

In the Public Office the main floor and wall beams are for the greater part in spans of various lengths from about 10 ft. to 25 ft. between supports, and most of the secondary beams are in spans of 18 ft. and 28 ft. 6 in. clear. The dimensions of the ordinary main floor beams average 8 in. wide by 16 in. deep, the corresponding secondary beams averaging 6 in. wide by 12 in. deep, these depths being increased to 19½ in. and 15½ in. respectively by the thicknesses of the floor slabs, which are 3½ in. thick on every story.

Fig. 9 gives a part elevation and a cross-section of a large continuous beam in the Public Office at first-floor level, this member supporting columns which carry nearly the whole of the floors above, the load coming upon the beam being about 300 tons, concentrated at two points near the middle of the principal span. The cantilever projection shown at the left-hand end serves for the support of a third column. The same drawing also contains a cross-section of one of the hollow beams, which were specially designed in that form to comply with the scheme of decoration included in the architectural drawings.

Fig. 10 is a part section through the Boiler House, showing the retaining wall, a column foundation, the general proportions of the beams, floor slabs, and partition walls, and one of the inclined shoots by which fuel is delivered. The upper floor, or roof, of this underground building is actually a roadway 50 ft. wide, over which passes ordinary vehicular traffic. In consequence, the main beams are necessarily of exceptional size and strength.

Fig. 11 gives a part longitudinal section of one of these beams with the clear span of 50 ft. and the depth of 10 ft. 2 in., the small sketch at the left-hand bottom corner of the drawing representing the external appearance of the same member. The space to the left of the beam is an opening intended for delivery of the boilers from the roadway above.

Fig. 12 is a section illustrating the construction of one of the arched beams in the Sorting Office. This particular member is 35 ft. long from centre to centre of the supports, its depth being 5 ft. 3½ in. at the springings, and 2 ft. 6½ in. at the crown, these dimensions including the thickness of the floor slab, which is 3½ in. thick, as in the Public Office. It should be mentioned that many of the beams in the Sorting Office block attain the span of 45 ft., and that the terrace roof beams, each 10 in. wide by 36 in. deep, are continuous beams, each of two 35-ft.

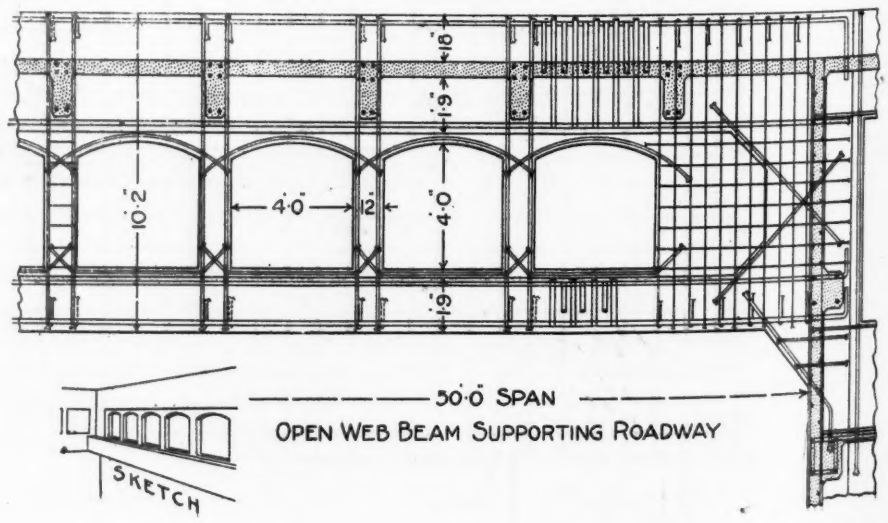



*Fig.* 11.

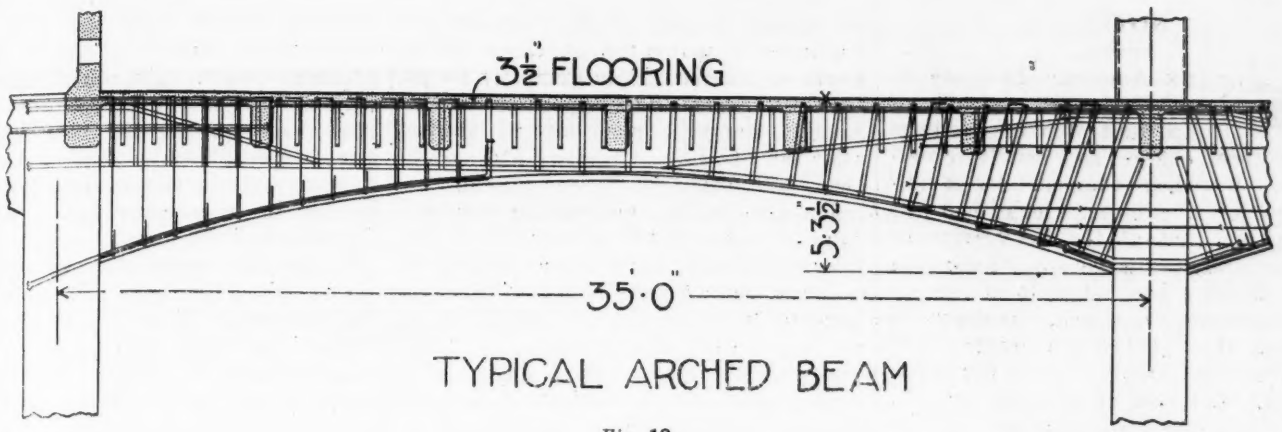



*Fig.* 12.

and one 45-ft. spans, supported by reinforced concrete columns which are only 14 in. square.

As a final example of beam details we give in Fig. 13 a selection of drawings referring to the open web box-girder bridge connecting the Public Office and Sorting Office at second-floor level. The clear span of the girder is 50 ft., its width 7 ft., and depth 12 ft. over all, while the thickness of the open web sides is only 5 in. near the bottom and 4 in. for the remainder of the height. If thrown across a river and mounted on abutments it would probably be regarded with perfect justice as a fairly imposing example of reinforced concrete bridge construction. In its present situation this interesting piece of work is quite dwarfed by the huge buildings at either end, although the critical observer will doubtless appreciate the meritorious nature of the design and the excellent manner in which it illustrates the applicability of reinforced concrete to structural problems.

Fig. 13 shows that the bridge is supported at the Sorting Office end by cantilever projections of the floor beams, a feature to which reference is subsequently made.*

* To be concluded in our next issue.

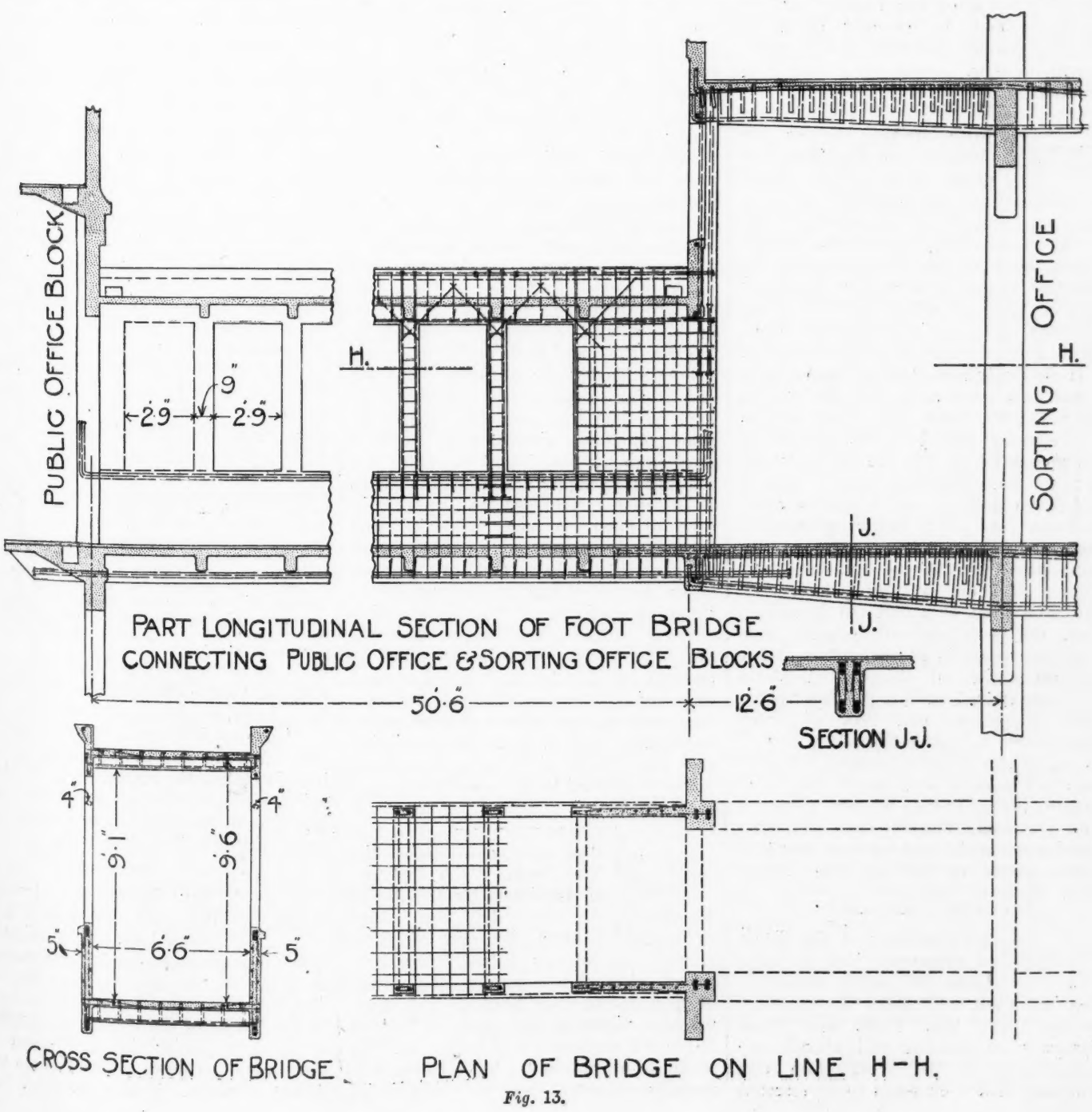



*Fig.* 13.

## NOTES.

Architects' Charges in America.

THE American Institute of Architects has taken an important step in reference to architects' charges as officially recommended by their Council. It is announced in a circular which has just reached us, that at the Convention of Architectural Societies at Washington in December a new schedule of charges was unanimously adopted, changing the minimum rate of charge from 5 per cent. on the outlay to 6 per cent. The circular states, as a reason for this, that while the remuneration of the architect has not advanced during the past forty years, the cost of production, office expenses, and draughtsmen's salaries has nearly doubled. Proper equipment requires a longer preparation and a more thorough education, and the responsibility of the architect has been enormously increased by the requirements of the modern structure with its engineering, mechanical, and electrical equipment. The profession, it is added, has for many years known that it was not being adequately remunerated for its services, and this definite step has now been taken of authorising a higher charge. Probably some of the reasons for the alteration may be thought to apply equally to conditions under which architecture is now carried on in our own country.

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The World's Iron Production.

SOME striking figures are given in the Parliamentary paper issued by the Board of Trade on the production of iron ore, pig iron, and steel. A century back 1,000,000 tons represented the world's annual demand for iron; to-day the quantity required is nearly 60,000,000 tons a year, of which all but about 8,000,000 tons is converted into steel. Thus while wrought-iron is not extinct, it is obviously nearly so, for the supply of cast-iron must come from the margin of 8,000,000 tons mentioned above. A gratifying record is represented by the production of iron ore to the extent of more than 1,000,000 tons by Canada and Newfoundland, and it is satisfactory to know that other British possessions are coming forward as producers of iron and steel. During the ten years ending 1907 our own output of steel has risen from 4½ million to 6½ million tons, the German increase being from 5 million to about 12 million tons, while the production of the United States has been from 7 million to 23⅓ million tons. Manganese ore, now of much importance to the steel-maker, is produced to the extent of nearly 2 million tons per annum, the largest source of supply being India, whence came in 1907 more than 898,000 tons—one more proof of the useful part taken in industrial developments by the outlying States of the Empire.

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The Gas Light Bill.

A COMMITTEE of the House of Commons had the Gas Light Bill under consideration last week, and found the preamble proved. The Gas Light and Coke Company of London will absorb the undertaking of the West Ham Gas Company, but a clause is to be inserted to compel the Gas Light Company to continue to make gas at the existing works of the West Ham Company for at least ten years. The opposition of the London County Council was withdrawn after the Gas Light Company had agreed that the standard price should be reduced to 3s. 2d., and that a standard calorific power of 125 calories net should be established. Before any penalty is incurred the calorific power of the gas must be 10 per cent. below the standard, as shown by the average of tests made on three consecutive days. This arrangement is to be subject to revision by the Board of Trade at the end of every three years upon request of the County Council or the gas company. The standard illuminating power is to be reduced from sixteen to fourteen candles. A standard calorific power has never before been accepted by any of the metropolitan companies, and this agreement with the Gas Light Company will assist the authorities of other towns in enforcing a calorific standard upon the gas companies by which the towns are supplied.

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The Storage of Drinking Water.

FURTHER proof of the beneficial results attainable by the storage of potable water is furnished by the third Report on Research Work presented at the last meeting of the Metropolitan Water Board. The first report showed that 99 per cent. of typhoid and cholera germs perished within one week after their artificial addition to raw river water; the second report made clear by negative yet voluminous evidence the rarity of pathogenic bacteria in raw river water; and the third report builds up a strong triple plea in favour of the safety of stored water. In addition to the safety attained by storage, the practice has the further recommendation of tending to lengthen the life of filters and of rendering a breakdown of the filtration plant far less serious than would otherwise be the case. While agreeing that the policy of storing all raw river water is good from the standpoint of safety, we consider it is highly desirable as a means of utilising surplus waters available in times of flood. A point lightly touched upon in the report is the employment of mechanical filters and precipitation tanks for purifying water rapidly in times of emergency. These and other modern methods clearly deserve consideration, not merely as stop-gaps, but as possible rivals to the time-honoured filter-bed. The researches so far conducted are undoubtedly of great scientific importance, and point to the conclusion that the quality of London water need never be allowed to fall below its present high standard.

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The Design of Beams and Stanchions.

TWO PAPERS read before the New South Wales Institute of Architects by Mr. James Nangle, F.I.A., have lately been issued in pamphlet form. In one of these memoirs the author discusses the theoretical principles governing the design of timber and steel beams. The treatment is virtually the same as that to be found in most text-books on the strength of materials, but attention is usefully directed to the effects of shearing stresses and the manner in which these influence the design of practical beams. The other paper deals with the design and construction of steel stanchions, quoting the floor load and stresses permitted by various American building codes, giving examples of calculations in accordance with Rankine's formula, and discussing briefly some of the numerous types of compound stanchions which are generally used in the present day. There is nothing very original in these papers, whose object was evidently to promote discussion on subjects which are as important to architects in Australia as in other countries.

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Bath-street, Bath.

AT the meeting at the Assembly Rooms at Bath, on Saturday, to promote the preservation of Bath-street, when the Rector of Bath occupied the chair, the following resolution, moved by the Rev. H. H. Winwood, was carried with one dissentient:—

"That this meeting of citizens and friends of Bath strongly condemns the proposed destruction of Bath-street, a unique and characteristic example of XVIIIth century architecture and an essential part of the Bath improvement scheme of 1789, and earnestly hopes that means may be devised to avert the threatened mischief."

Copies of this resolution were ordered to be sent to the Mayor of Bath and to Mr. Waring, whose plans for the remodelling of the Grand Pump Room Hotel involve the destruction of the north side of Bath-street. The meeting was addressed by Professor Beresford Pite and Mr. Maccoll, the former speaker remarking (and we entirely agree with him) that "if they took down one side of the street they destroyed the whole design. Nothing more stupid could be conceived, and the present was a very unfortunate time for such a movement. The proposed alteration would destroy an historical link of great importance to architecture; it would degrade a building of complete and unique beauty, and it was altogether retrograde and unworthy of the day." A letter was also read from Professor Blomfield, A.R.A., in which he said:—

"Bath is unique in England in having been to a great extent laid out on a systematic plan, in which a deliberate attempt was made by the very able Bath architects of the XVIIIth century to obtain architectural dignity and beauty by well-considered perspectives and alignments. Bath-street, coming as it does in the centre of the city, is an integral and vital feature of their scheme, and to alter it in the manner proposed would inflict irreparable injury to the architecture which gives Bath its peculiar dignity and its peculiar charm."

It is to be hoped that these utterances may have some effect on the city officials who have proposed to commence the architectural destruction of their beautiful city. We are glad to see that the *Times* has also taken the matter up in the right spirit. Illustrations of the street proposed to be destroyed were given in our issues of March 6 and March 13.

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The India Museum.

THE Board of Education does not yet seem to have realised the strong objection which is so generally felt to their proposal to break up the fine Indian collection. The fact that it has been added to while in the charge of the Department appears to them to justify this distribution for the general purposes of the Victoria and Albert Museum. In this we think they

entirely miss the great object of this collection, which is to bring before the English people not only the art, but the life, customs, and ideas of the people of India—in fact, to teach something of India itself. This is a much more truly educational object than the minor one of facilitating the students of particular crafts in the comparison of the arts of different countries; and the Board would do well to rise above a slavish attention to a system of classification. We understand that an important deputation will wait upon Mr. Runciman to urge this view during next week.

## THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE usual fortnightly meeting of the Royal Institute of British Architects was held on Monday, at No. 9, Conduit-street, W., Mr. Ernest George, President, in the chair.

The Secretary announced the decease of Mr. Alfred Henry Paget, elected an Associate in 1870 and a Fellow in 1892. Mr. Paget was a Past-President of the Leicester and Leicestershire Society of Architects, and represented that Society on the Council of the Institute in the year 1892-3.

### *British Sculpture.*

Mr. M. H. Spielmann, F.S.A., then delivered a lecture on British Sculpture, illustrated with a large number of lantern slides. He asked them to bear in mind that he was in a position of some difficulty in that he was presuming to speak to many who were artists, and had to say before them what he had been for a long time saying behind their backs. He would have their sympathy and goodwill in anything he would say, knowing as they did that his aim throughout was to point out to the public, so far as he might, the good in things, without criticising unnecessarily the indifferent and bad. Moreover, in justice to himself, he must tell them that his paper was an attempt to compress into a single hour the three lectures he delivered before the Royal Institution, and in the compression he would have to omit much and to suppress all his talk about the philosophic and technical theory of sculpture. He wished in the series of slides to give an object-lesson rather than a theory lesson, and to try and show the remarkable position to which in these later days British sculpture had developed. The object of the paper was not primarily to deal philosophically with the theory of sculpture, for that would be impossible in the time at his disposal. It was rather his aim to show that a school of sculpture had arisen in Great Britain within the memory of some present, and he hoped to show illustrations of a great many of the works, and to offer such words of criticism and suggestion as might properly be expressed in respect of the efforts of men, most of whom were still amongst them.

### *The Awakening in British Sculpture.*

Since 1875 a great change had come over British sculpture—a change so revolutionary that it had given a new direction to men's conception of the art, and had raised their British School to a level not hoped for or expected thirty years ago. Their sculptors awoke to a feeling of appreciation of plastic beauty and found themselves practically with no art but their own to inspire them. There was no national tradition, and they had to begin at the beginning. The awakening mainly came about from the influence of two Englishmen—Leighton and Alfred Gilbert, and in a lesser degree of Onslow Ford. Since then the whole conception of sculpture in England had been modified.

### *The Period of Bad Sculpture.*

It was difficult to realise how bad our sculpture was sixty or seventy years ago. It had been said that then they had four grades of merit in their monuments —"bad," "worse," "worst," and "worst of all." Men began to rebel against what they saw, and asked if it was sculpture or art. They looked at the George III. statue close to Trafalgar-square, and declared they had never seen so drunken a horse and so sober a rider. The fact was that the statue group was originally a St. George and the Dragon, commissioned by King George from Wyatt. Before it could be cast the King died, and the dragon was removed, and the horse was left startled, as well it might be. Thackeray said he once took a French friend and showed him the Wellington statue, and the Frenchman said that Waterloo was avenged.* Ignorance of sculpture was confined to no class, and was to be found inherently in the highest official classes. "The only way for a nation to obtain good art," said Ruskin, "is to enjoy it"; and a pretty safe way to ensure bad sculpture was to appoint a Minister of Fine Arts from amongst politicians. They remembered not so long ago an ex-Cabinet Minister throwing jesting scorn upon one of the finest of modern architectural works—he referred to the New Scotland-Yard of Mr. Norman Shaw; and he was pleased to say this led to a protest by the leading architects of the country. No wonder that Canova, hearing such commonplaces about sculpture, said: "You English see with your ears."

### *The Public and the Sculptor.*

Nearly all public patronage had gone to encourage bad art, but the most mischievous ignorance was that shown by Committees formed for the erection of public statues; unconsciously they crippled the artist by their irritating interference, and had driven many sculptors into failure. They should remember that they should do nothing to disturb the delicate organisation of the artist, who was at the mercy of his inspiration, which was the very essence of his work. The committee of a musical festival attempted no interference with the musician when they had commissioned him to write an oratorio, and sculpture was not less a matter of harmony and science. Although the Committee might pay the piper and thought they might call the tune, they did not buy the right to say how the tune was to be played, or to interfere while it was proceeding. The model in its development was so technical and so deceptive to untrained judgment that those who had no actual training should leave the matter to those who knew. But besides knowledge there was taste, and taste must be trained for fear it was corrupted by the shallow and meretricious in art, which was more offensive and dangerous than mere incompetence. Bad taste was worse than no taste at all—no taste might be educated, but bad taste was vicious already. They saw the reflection of it in the extraordinary popularity of the clever trash from Italy around which admiring crowds gathered in the popular exhibitions and in the open saleRooms of our great towns. It might be clever in its way, but the effect was attained by tricky vulgar methods and false sentiment. The sculptor who executed such work and did it successfully was like the man who toiled and got his strength and agility from turning big somersaults for the delight of the crowd.

### *Characteristics of the Modern School.*

Chief amongst the characteristics of the modern school was the effort for a picturesqueness of treatment which did not detract from the dignity of the conception. Sculpture primarily must represent ideas and not things. Michelangelo had said: "The nearer painting is to sculpture the better it is; the nearer sculpture is to painting the worse it is." The present aim was to give life without undue realism. It was based on a love of beauty and its significant representation in human form. It had been said: "The aim of art is beauty; clothes are the outcome of necessity; what has art to do with necessity?" It was not only the beauty of form which attracted the sculptor, but the beauty of play for its own sake; and all this was in a great measure concealed by drapery. It was not surprising that sculpture was little understood in this country, or, indeed, by the general public anywhere, for the eye was ever affected more by colour than by form. Again, whilst painting was frankly illusive, sculpture appeared to the uninitiated as imitative; but it was nothing of the kind. Its beginnings were more easy than any other art, but its endings more difficult. The uninitiated clamoured for pictorial treatment, but in sculpture the model had to be idealised or the result was commonplace; and further, while the painter could take almost anything for his subject, the sculptor was severely restrained. Sculpture was the expression of form without colour, atmosphere, and tone, and the introduction of colour therefore condemned itself. Indeed, the more a statue looked like the real man the less it was like sculpture, and the more it was like waxwork. Whether we set up in our public places white or brown or green gentlemen, we must realise in him a certain nobleness, esteem, and quality which could justify the commemoration of any man in sculpture.

### *The Work of the British School.*

With those words he turned to the work of the British School. Until Alfred Stevens scarcely anyone in this country thought of instilling real life and blood into marble; and what life it was that Stevens realised! Stevens was in the right sense unconscious of his greatness, and had not the accident of an open competition made his genius apparent to the world, he might have gone on to the end with an occasional portrait, the designing of fire grates, and of occasional decoration. How many people were aware that the table in the refreshment-room in the South Kensington Museum was by Alfred Stevens? One of the secrets of his success was his knowledge of construction, and his feeling for architecture helped him to do sculpture with a fine decorative effect. The lecturer proceeded to give a long series of slides illustrating the work of modern sculptors, commencing with a sketch of Stevens's design for the Wellington Memorial in St. Paul's Cathedral. He pointed out that the altered design was owing to Stevens knowing the horse would not be put up. Now the horse was going up, and the whole thing would be out of scale. The second slide was a statue of a horseman by Thomas Woolner, which was the best thing he exhibited in the British Academy. Works by Sir E. Boehm were next exhibited, and Foley's statue of General Outram, now in India; Armstead's work at the Colonial Office, and a statue of his at Woolwich. The lecturer said that the crowning merit of Armstead's work was its unornamental character—the sense of style without any chance effect. Geo. Lawson just escaped general recognition as a fine sculptor, and his "Motherless" was a fine work and full of distinction, but was almost too pictorial for sculpture.* When Brock went to London in 1866 he was in the studio of Foley, but he modified his style, and had left his master far behind. The ideal work which marked his transition stage was "The Moment of Peril," soon to be surpassed by the "Genius of Poetry." A higher point still was reached in "Eve." Brock had also excelled in portraiture, as was shown in his Dr. Philpot at Worcester, the treatment of the drapery and especially the sleeves being very striking. His statue of Sir Richard Owen showed the same understanding and handling; whilst his bust of Queen Victoria was one of the noblest, most dignified works of its class done in England. The delicate feeling was carried so far that the marble almost resembled flesh. The sculptor's masterpiece, however, was

* We have heard this story told, with more point, as to the Wellington statue formerly on the Constitution Hill arch.—ED.

* Lawson, who was never appreciated at his true value, executed a grand figure of the dying Cleopatra (his finest work), which stood one year in the centre of the octagon room at the Royal Academy, and was the prominent work in sculpture of the year.—ED.

the tomb of Lord Leighton in St. Paul's—the effigy of Leighton and the figures at the head and feet personifying Painting and Sculpture—it was a monument in which the late President himself would have rejoiced, for all was joy, beauty, tranquility, and peace. His "Edward the Black Prince" at Leeds was one of the most impressive works produced in our age, and looked much better where it was now than when shown in London. Several photographs were shown of the sculptor's models for the Queen Victoria monument opposite Buckingham Palace, and Mr. Spielmann said he was sorry it had become necessary to alter the original scheme for the ball supporting Victory, which was now to be of marble. He thought the sculptor had judged soundly in following traditional lines for this great work, for this was not a case in which to make experiments or run risks by striking out in a new direction. The work was in thorough good treatment, and it could not be doubted that it was a work which would crown Mr. Brock's career. Coming to Sir Charles Lawes, Mr. Spielmann said he spent his life in producing a few works of high ambition. He was always strong and healthy in his work, which was of a good, robust character. Even if his work wanted repose in manner, it was compensated for by dignity. In "Lot's Wife" Mr. Hamo Thornycroft proved that a new sculptor had arisen amongst us. Then came "Artemis," a surprise to those who thought they had taken the sculptor's measure. With "Teucer" he reached the high-water mark of his career—it was instinct with life and noble in form. His "Sower" was obviously inspired by Millett; but it was a brilliant example of the realistic, whilst his General Gordon in Trafalgar Square was one of the finest statues in London. They had also the statue of Dean Colet. In the national memorial to Mr. Gladstone in the Strand they had from the point of view of importance the *magnum opus* of Mr. Thornycroft, and the figure showed the dignity and almost stern benevolence of the man. One of the groups symbolised education, and by a curious chance was actually pointing towards the old School Board offices. Mr. Havard Thomas's public monuments of Samuel Morley and Gladstone were fully up to his ideal work at the Franco-British Exhibition. The best of all his things was the bust of Mrs. Wertheimer, which Mr. Wertheimer had presented to the Tate Gallery. Onslow Ford made his first success with a figure of Henry Irving as Hamlet, but his later bust of Huxley was more strikingly sculpturesque. His "Gordon" at Chatham, mounted on a camel, was more open to criticism from the multitudinousness of ornamental details. He thought it really overstepped what was allowable in sculpture. His Shelley monument and the head of Sir John Millais might be considered amongst his best works. Ford's work always charmed, although by no means of the highest class, and he would have taken a higher position if he had been more restrained in the way of ornament.

In 1877 there burst upon the world a sculptor in the person who was the following year to be the President of the Royal Academy. Lord Leighton had told him that he was amusing himself in his studio one day by twisting in his fingers a piece of modelling clay until it roughly took the form of a man struggling with a serpent, and the "Athlete Struggling with a Python" was the result. No work of modern times made a greater stir on its appearance than this group modelled by a painter, and which would have done honour to the ancients. Grand in style, noble in type and form, learned in knowledge of the human figure, fine in pose, in action, and movement, palpitating in muscular life, brilliant in execution and instinct with the manner of the painter himself, the work was hailed justifiably as something marvellous—the greatest achievement in its way ever produced in England. And yet it was felt to be lacking somewhat in expression—in that kind of humanity which every great masterpiece must exhibit. But Leighton did not care, and said he had gone for beauty of form to the neglect of sentiment. But one day the model, after sitting for Leighton, stood up to stretch himself, and the artist cried out to him to stop just as he was, and there he kept him standing for two hours, making a sketch for "The Sluggard." Although simple in design, it was higher in accomplishment than the athlete. It was as Greek as the other in its devotion to form, but instead of representing the action of occurrence it had the higher conception and some of the mystery which was so distinct in the finest art of ancient time, and in which modern sculpture was deficient.

The position of Alfred Gilbert in the art world of Great Britain had long been proclaimed by British sculptors and the public, and his artistic productions were almost beyond being harmed by the sculptor himself. Rarely had a man burst on the world of art with such a message of hope translated into achievement. His chief production in his young days at Rome, "The Mother and Child," bore somewhat a resemblance to Michelangelo's work. It made a great sensation there, and he was watched for in this country, and the critics were rewarded with his "Perseus." His portrait works were full of character. There was his John Howard at Bedford; but greater far was the colossal statue of Queen Victoria at Winchester, and it marked the highest level to which sculpture and monumental work had reached for many a generation. His work as it stood was a veritable masterpiece, but it was seen how some people in this country cared about masterpieces. The statue was designed for the interior of the City Hall, but when it was presented to the municipality they said they had no room inside and it must go outside. It was first set up in a bad position, and now it had been erected in a public garden, but an indifference to this treasure of art had developed in the populace. It was set on a plinth where it was too high to be seen, and the figures had disappeared. No wonder that Gilbert had declared his loss of interest in the work and his unwillingness to see any scheme of restoration. They had also the Duke of Clarence memorial at Windsor, the whole composition of which was formed on the simplest lines. Mr. Spielmann showed a photograph of a model for the Leicester War Memorial, the non-completion of which had brought the sculptor into such dire trouble. He said the public thought that Gilbert had done no work for the money entrusted to him, but the colossal model exhibited was the first one he made. It was practically finished, but thinking he could do better, he broke it up. The second model met a like fate. His assistants refused to destroy it, and he went up himself and did it. A sculptor of his passionate devotion to his work thought only of his art and forgot the subscription list. At the present moment there was a third model which he (Mr. Spielmann) had seen himself whilst misfortune was overwhelming the sculptor. He knew of no sadder story in the whole history of art.

In the work of Harry Bates they found a flexibility which few, if any, young Englishmen had found before. In his "Pandora" he had achieved the purity of style at which the sculptor aimed. They had also his "Hounds in Leash" at the Tate Gallery. In the short life in which he laboured, Bates did splendid service to their school of sculpture. Sir George Frampton was one of the most versatile and original artists of the day, thoroughly in the new movement which he did so much to adorn. Thoroughly accomplished, he was at home in every branch of art and covered the whole field. Scarcely fifteen years ago he produced his "Children of the Wolf," and in the statue of Dame Alice Owen in bronze and marble there was something quite distinct. In his distinctly decorative work he was at his best, and in his memorial tablet to Mr. Geo. Mitchell in St. George's Church, Newcastle-on-Tyne, he introduced carved lines having more affinity to wood working than to sculpture. He had great powers as a designer, and hardly less as a modeller, and his work was always dignified. Mr. H. Pegram's work always showed an appreciation of sentiment, and was characterised by movement and life. Mr. Alfred Drury attuned his art like his own sweet tenor voice. The lines formed by old age were infinitely easier than those of children—it was easier to make the model shriek than sing. They knew that Mr. Drury had carried out colossal groups. Dignity was the keynote of his conceptions with broad and beautiful modelling. Of his purely decorative architectural work they had the decorations of Vauxhall Bridge, and that on the house being built by Mr. Belcher at the corner of St. James's-street, Piccadilly. Mr. Pomeroy was one of the prominent younger men of to-day, and his versatility was somewhat bewildering, for he could work in every style. He did what he liked, and did it well. But he did not think he had yet shown the full possibilities of his individuality. Perhaps it would be seen in the statue of Robert Burns for Paisley, which was one of the most refined of the statues to that poet yet raised.

Apart from his monuments the most scholarly of Mr. Albert Toft's works, and the most sympathetic, excellent in line and pose, was the "Mother and Child." Mr. Lanteri, excellent sculptor as he was, yet as a teacher had absolutely no superior, and some of their most successful sculptors owed much to him. His demonstration modelling was wonderful. Of Mr. Goscombe John's work there was the austere figure of "St. John the Baptist," acquired by Lord Bute, and the colossal effigy of the late Duke of Devonshire at Eastbourne. If they compared these it showed the extraordinary range of his art. Strong in design, he would be stronger yet. Mr. Bertram Mackennel had executed "The Child Christ," and "Diana Wounded"; whilst his work on the Government Offices was the best modern work of its kind in England. There was no doubt that in the future he would take his place very near the head of British sculpture. Of Mr. Fehr they must expect better work than they had yet had. In "St. George and the Rescued Maiden" there was a lack of sincerity in the treatment, and he was apt to overdo things. In his recent "Fallen Angel" there was both strength and weakness. It showed a twist of the body absolutely impossible for anyone but a professional contortionist. Mr. Colton's Mermaid Fountain in Hyde Park was ordered by a Chief Commissioner of Works during a lucid interval, and his "Crown of Love" was charming in sentiment and admirable in execution. They must regard him as amongst the leaders of the younger men.

The original work of Mr. Alfred Hodge wanted a lecture to itself, and interested him as greatly as any produced at the present day. It was remarkable in style and character. As they saw the reliefs in the Franco-British Exhibition they did not strike them with their full significance, and few painters and sculptors seemed to understand what the sculptor was driving at. The photograph before them was taken in such a way as to show the relief as it would appear on a building, and it was a fine example of architecture devoted to sculpture. There was, however, one practical question one asked, and it was whether a work so thinly undercut would stand the weather?

Several of their sculptors had been trained as painters, but, excluding Alfred Stevens, not one had surpassed in power Geo. F. Watts, who as a sculptor gained their respect and enthusiasm. The half-dozen pieces of Watts's placed him on a high eminence as a sculptor for all time. His Bishop Lonsdale at Lichfield was an epoch-making work, and the head was magnificent in its expression of solemn dignity. He did not, however,

show his full powers until he produced the statue at Eaton Hall. There was also the colossal statue, "Vital Energy," placed near Rhodes's tomb in South Africa. The work of Watts was a marvel amongst the men of to-day. Did not the work of this grand old man, who in his eighty-seventh year worked on one of his masterpieces, the statue of Tennyson, mark for them a true standard and point out the way to those who were younger?

Mr. Goscombe John, in proposing a vote of thanks to the lecturer, said it was an uncommon thing to hear anyone lecture about sculpture, and still more uncommon to hear one lecturing who really knew. Mr. Spielmann had brought not only sympathy and feeling to his subject, but an amount of knowledge which was rarely met with. Most arts were difficult to talk about when a man had not the initiative, but perhaps the most difficult of all was sculpture. There were so many things connected with the technical part, and it was almost impossible for the outsider to know what was really the result of pure technique and what was the result of pure sentiment. In judging sculpture that was one of the rocks on which usually a lecturer split. Mr. Spielmann had told them many interesting things, and perhaps the most interesting was as to the origin of all which had taken place in the last thirty years. They would all feel that Lord Leighton must be looked on as the man most responsible, and agree that the figure of the youth and the python was an epoch-making figure which was still thought of with admiration.

Mr. Colton, in seconding the motion, said he thought sculptors as a whole were greatly in want of spokesmen. They were very diffident, and were really in need of a great many spokesmen in England now. It had been struggling for the last few years to become a School of Sculpture, if he might say so, and perhaps it had hardly yet arrived at the time when it could walk without a nurse. He felt that Mr. Spielmann was the only spokesman they had to-day who really loved sculpture for sculpture's sake, and who was not led away by mere eccentricities of sculpture. He felt that they were in sore danger of having a mist come over their intentions in sculpture, for there was a curious craze at the moment, as they all knew, for mutilation. It was extraordinary. They had seen it in good-class exhibitions, where almost every exhibit had been a portion of the figure. They had seen arms alone, heads split into sections, and many kinds of mutilation. They had seen one figure exhibited, and he believed greatly admired, of a leg which appeared to have been cut off by a train. All these fractions of figures were really supposed to be very artistic and very fine. Of course, they were simply eccentricities, and were not fine work in any way. They were a cheap way of doing sculpture, and a way in which anyone could succeed, because there was no difficulty in doing a fraction of a thing. He thought they wanted spokesmen like Mr. Spielmann to thoroughly point out as he did with the utmost affection the beauties of sculpture. He did not mean criticise in a destructive manner. He remembered the statue of the Black Prince which Mr. Spielmann had referred to being called in one journal a "gilded abomination." That was the kind of criticism which Mr. Spielmann did not uphold at all. It was a phrase without sense and feeling, and with nothing at the back of it. If sculpture was to succeed it must be criticised in a friendly spirit or it could not succeed in England, where everything was against it.

Mr. H. H. Statham, in supporting the motion, said that sculpture was the art for which he had the greatest passion, and it seemed to him the most intellectual of all the arts. In regard to the progress of modern English sculpture he was old enough to remember the rows of busts one used to see year after year at the Royal Academy, like a row of pins' heads, and with no character at all. But how different it was now! They still found a certain number of the old kind, but there were many works which had character and symbolism embodied in their execution. He was afraid that sculpture never could be a popular art in any country, and still less in England, because it was essentially an abstract art. It seemed to him that the great object of sculpture in its highest representation was to present an abstract thought in an abstract way; to use the figure not merely as an imitation of nature, but to express an idea. He would like to mention, as an illustration of this, the centre group in Bartholomé's Monument aux Morts, which was first exhibited at the New Salon by itself—the group of a man and a woman, with their backs to the spectator, looking into the doorway of a tomb. He could never forget the impression this group made on him; it seemed a poem in itself. It was well worth going to Père Lachaise to see the complete work; it was a very remarkable work as an example of suggestive sculpture. As to the difficulty of dealing with dress, it occurred to him that they could deal with complete costume figures much better in bronze than in marble, as the material seemed to lend itself much better to the purpose. He had been struck with the way in which the French very often got over the costume difficulty. It was a very favourite fashion with them simply to place the portrait bust of the man on the head of a stele, and then to surround it with abstract figures representing the different virtues. That had been done also by Mr. Gilbert in his monument to Fawcett in Westminster Abbey. It seemed to him a happy way of escaping the difficulty of dealing with modern dress, which was not sufficiently abstract for sculptural treatment. There was one point in the paper on which he rather differed from the author, where he spoke of the connexion of sculpture with architecture. He could not say he considered that the Gladstone monument was a success. The portrait statue was fine; but the other figures had no architectural connexion with the centre; they stood out raggedly all round. It appeared to him that when they used an architectural construction to form the centre of a sculptural monument there should be a distinct unity between the figures and the architectural part, and that was where the sculptor had failed. There was one work of Mr. Gilbert's to which Mr. Spielmann had not referred. It was one of his earlier works, and he was afraid no longer existed. He had forgotten the title, but it was the figure of a large nude woman seated in deep sleep in a sort of antique chair, with an eagle with outstretched wings standing over her. It was full of poetic suggestion, but he was told it never went beyond the clay, and that the sculptor destroyed it. He was glad, however, to say he had an illustration of it, which he prized very much.

Mr. Goscombe John said Mr. Statham had spoken the truth about the busts on pedestals. He thought sculptors were agreed that it was a most delightful way, but Committees would not have it. He had tried over and over again when he had had work to do to get them to agree to this, but in only one case had he succeeded. They would have the man, the whole man, and every bit of the man—frock-coat and boots and everything.

The resolution having been agreed to,

Mr. Spielmann acknowledged the compliment, and said that Mr. Colton had referred to their young men being led away by many of the mere ephemeral movements of the present day. At the opening of the Franco-British Exhibition a distinguished French artist came over and expressed his surprise that they had anything like the British sculpture they had. He had no idea that the English school had so suddenly sprung forward, and what struck him still more was that their younger sculptors had avoided the pitfalls into which some of the cleverest of the young men in France had fallen. He had in his mind a study which came under the heading of something which Mr. Statham had said—the study of a lady in full dress, with a great deal of lace falling down. The gentleman to whom Mr. Colton referred specially was one who had carried the practice of exhibiting small fragments of the human body to an extreme, and who declared that one of the exhibited works which he was most pleased with was a representation of a lady's jaw—he said it was a lady's jaw. Mr. Statham was mistaken as to what he said about the Gladstone memorial. He said it was Mr. Thornycroft's *magnum opus* for size "if not for quality." Still, they had to remember that Mr. Thornycroft was faced with a particular problem which he had to work out. He had to work out and convey the man himself, showing his sturdiness, represented in the firm figure, and the agitated life through which he passed represented with the other figures. If he did not get movement in the figures—if he had repose—he necessarily would lose the whole motive he had in his mind in the design of it. The particular work of Mr. Alfred Gilbert to which Mr. Statham referred was, he believed, called "The Enchanted Chair." He was sorry to say it had been destroyed, like a good many others, because the artist thought it was not up to the highest stage of what he might do.

The Chairman announced that the next meeting would be held on April 19, when Mr. Riley would read a paper on "The Architectural Work of the London County Council."

## Architectural Societies.

### GLOUCESTERSHIRE ARCHITECTURAL ASSOCIATION.

A meeting of the Association was held on Thursday last week, the President (Mr. H. W. Chatters) in the chair. Messrs. R. Lyne, W. E. James, L. C. Stanley, and S. W. Thurston were elected associates. Mr. F. W. Waller read a paper entitled "A Holiday in Egypt." Commencing with Cairo, he described the principal temples on the banks of the Nile as far as Philæ, illustrating them with lantern slides, both of the buildings themselves and their details. In addition, Mr. Waller gave much historical information on Egyptian architecture, and contrasted by means of specially prepared lantern views the Great Pyramid with Gloucester Cathedral and its precincts, and the Great Hall of Karnac (the largest temple in the world) with the nave of the cathedral, the latter appearing very diminutive beside the former.

### ABERDEEN ARCHITECTURAL ASSOCIATION.

The annual business meeting of the Aberdeen Architectural Association was held in the Northern Arts Club on the 25th ult., Mr. James B. Nicol, President, in the chair. The Hon. Treasurer (Mr. James Blake) submitted the financial statement, showing that the year had opened with a debit balance of 1*l.* 2s., and had closed with a sum of 1*l.* 8s. 8d. in hand. The Chairman submitted the annual report of the Committee, which stated that the session had been a very successful one. Owing to the increase in membership, it was found desirable to separate the offices of Secretary and Treasurer, which had since been satisfactorily filled by Mr. R. W. Gibbon and Mr. James Blake respectively. The result of the efforts of the sub-committee appointed to endeavour to increase the membership had been most gratifying, the Association now having about eighty members. The report expressed regret at the death of Professor Hamilton, one of the honorary members of the Association. That was the first break that had occurred in the membership through death, and they desired to place on record their sincere appreciation of Professor Hamilton's work. The report was unanimously adopted, and the office-bearers and Committee were

reappointed as follows: Honorary President, Mr. Arthur Clyne; President, Mr. James B. Nicol; Vice-President, Mr. R. Connon Garden; Hon. Secretary, Mr. R. W. Gibbon; Hon. Treasurer, Mr. Jas. Blake; Members of Committee, Messrs. John M. Ailsen, A.R.C.A., Sidney H. Brown, J. Murray Easton, Gro. G. Irvine, James Nicoll, and Walter Rhind.

A joint meeting with the Aberdeen Society of Architects was subsequently held for the purpose of hearing a lecture, by Mr. Alexander N. Paterson (Glasgow), on "Tradition in Architecture, its Function and Value." Mr. Paterson said we were sometimes told that our present age was one of scientific development, and that art, original creative art, languished or was dead. It had been stated also that architecture now consisted merely of copying what had been already done, and done better in the past. Art or fine art they might take to be in its widest sense the creation of the beautiful, the production under the combined influence of thought and emotion of an object which in that particular form or combination of forms had not previously existed, and was the living creative interest which devoted itself to the design and creation of buildings which would satisfy all requirements, and be in accord with the sentiments of the present time. All art was subject to definition or retraction, and architecture of all the fine arts was most so subjected. The gradual gathering up, the accumulation of a tradition of former ages had provided architects with certain methods, certain formulæ of construction—the lintel, arch, and the vault. It was not possible to conceive of any other means of cornering in space, which in its essence was architecture. Let them look at the position of architecture to-day, following on and wholly the result of the remarkable and interesting study of that art during the century which had passed. For nearly a hundred years Britain had followed a path of her own in such matters, with results that could scarcely be called successful. They were likely to emerge where they entered. Meanwhile the neighbouring nations on the Continent had been quietly pursuing and developing the traditions of earlier lines in the light of modern requirements, and so far as civil art was concerned were far ahead of us. With regard to our architecture, it was not the nation or the men that were at fault, but the point of view, the methods, and the lack of continuous tradition. In the XXth century, however, there was good hope that British architecture would assert itself in those natural and national characteristics of dignity and refinement. He criticised strongly the "new art" that had been fostered, but stated that in that direction things had improved during the last five or six years. At times he was almost forced to believe that the tone of originality, for its own sake, was the root of all evil in the pursuit of the fine arts. In conclusion, he said progress in our art, individual, national, world-wide, we all, of whatever school, desired. Progress, as history taught, had been ever best secured by continuity, and continuity was, after all, but another name for tradition, which, in a last word, established its place in that our most inspiring, most ennobling, most ancient, and most traditional art of architecture. Mr. Arthur Clyne and Mr. Henry David expressed appreciation of the lecture, for which Mr. Paterson was heartily thanked.

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THE BUILDERS' CLERKS' BENEVOLENT INSTITUTION.—Our report of the thirty-first annual dinner of the Builders' Clerks' Benevolent Institution is unavoidably held over until next week.

EXTENSION TO THE GRAMMAR SCHOOL, BRISTOL.—The "Fenwick Richards" wing of Bristol Grammar School has now been opened. The new building has been constructed by Messrs. S. Martin & Son, of Bristol, to plans prepared by Mr. Frank Wills. The heating arrangements were installed by Messrs. Crispin & Sons. The wing is composed of a dining-hall (with kitchen), four classrooms, and a laboratory for elementary science.

## THE ARCHITECTURAL ASSOCIATION: A LESSON FROM THE PAST.

THE following is our report of the discussion which followed Mr. J. A. Marshall's paper entitled "A Lesson from the Past," which was read before the Architectural Association at the ordinary general meeting on the 19th ult.

Mr. H. Home, A.M.Inst.C.E., said, as to the sentiment expressed in regard to the alliance of engineering with architecture, he might mention that some four or five years ago he was asked to design a steel bridge. It was specially arranged that it should be of steel, and he had no option in the matter. He was also told that when he had designed his bridge an architect would be called in to make it beautiful. He accordingly worked out the forces acting on the structure, and arranged the construction of the bridge to meet those forces, the stresses and strains being met by a given amount of material. The architect then came along and hung little stones all over the bridge, and added 40 tons of masonry to the main girders. He (the speaker) might also mention that he had been called in lately to report on three designs for a ferro-concrete roof over a big hall. The roof was in all three cases admirably designed, but he observed in the elevations the same fine buttresses that would be put up in a Gothic building with a barrel vault of stone having thrust. As an engineer, he should not have put those buttresses at all, as there was only a gravity weight on the wall. He made these remarks because Mr. Marshall suggested that the ways of the engineer were devious and deceitful, whereas he (the speaker) considered they were transparently honest. The general question was very interesting to all constructors. He had had the opportunity of examining the construction of a number of the old buildings of the world, and it struck him that the designers of the early times seized on any material that would suit them. He lately had been reading the "De Aquis" of Frontinus, who was the Roman engineer in charge of Rome's water in the year 79, and he observes the arches and domes are sometimes divided by lines of tiles; this would have the effect of forming distinct lines of pressure or cleavage. Then there was the well-known case of St. Vitale erected A.D. 526 at Ravenna, where the upper part of the dome of 50 ft. span is made of wine jars—a valuable material and a wonderful conception, enabling the builders to dispense with the arches and buttresses found necessary in S. Sophia. If builders of those days had had a material like ferro-concrete at their disposal, would they have refused to use it at the upper part of a dome, where lightness was requisite, if they got the right architectural effect inside the dome? He believed, in spite of Mr. Marshall, that the constructors of that day would have used a material like ferro-concrete, which was admirable in tension and compression within certain limits. In judging of an Engineer's works should they take those works which he built for temporal purposes, or those works which he believed would last through the centuries? Rather judge him by his great dams, conduits, and cyclopean works. These works would compare favourably with any work the world had ever seen. The engineer's imagination and powers of design now were as great as ever. At the present time dams over 300 ft. high were being designed and erected. Temporary works which architects looked at and despised, perhaps—roofs and spans, steel bridges, etc.—were not to be judged by the same standard, although they were an expression of the material in which they were designed. He thought he could say this for engineers—they did not pretend to construct palaces or ordinary buildings, and it was not mentioned in the charter of their Institution that they should. The charter of the Institution said that an Engineer was one who used the "art of directing the great sources of power in nature for the use and convenience of man." The subject of ferro-concrete was one of pressing and immediate importance. It had come on all of them, not excepting engineers, with a rapidity altogether extraordinary. He had listened to the paper with great interest, and he had pleasure in proposing a vote of thanks.

Mr. Gerald C. Horsley said he had much pleasure in seconding the vote of thanks to Mr. Marshall for his interesting paper. It was a paper full of thought, and one which quickened thought. Mr. Marshall made an appeal for honest architectural construction, and hoped that the future would give us again that almost universal artistic sense which the world once had. They could the more understand Mr. Marshall's views when they remembered his connexion with the cathedral in Westminster which they all so greatly admired. But while one sympathised with Mr. Marshall, one could not follow him in the remarks he made upon the assistance an engineer could give an architect in his work; nor could he (the speaker) see why we should object to use steel in our buildings. We frequently used brick, and both brick and steel were manufactured materials. If steel was used in a building, the architect must know something of course about the material he was handling, otherwise the architectural quality of the building would suffer. So long as we ourselves understood the limits and possibilities of steel in any particular case, consultation with an engineer and assistance from him was surely of the utmost value. An alliance of this kind had certainly produced some fine work; such, for instance, as the new Lyons railway station on the Quai D'Orsay in Paris. With regard to reinforced concrete construction, the whole method was so much in its early days that its capabilities were hardly known. He did not see why an artist should not be able to make use of this new method. It might lead, by the wide spans which were possible in it, to some extraordinary developments in planning. He believed the architect of the Post Office building to which Mr. Marshall referred had said that architects using this form of construction should make their own drawings themselves, instead of handing sketch plans to the engineer of the particular patented process they proposed to use. Well, of course they should do so. He did not see how it was possible to design unless this were done, and, after all, there was no mystery in these patent systems; the principle of the thing could be mastered in a short time. But designing in ferro-concrete was in its infancy, and, as it was a terribly hard material to cut into or make any alteration in once it was built, it was hardly likely to be widely used for private houses or in buildings likely to need alterations or additions in the future. There was certainly one advantage this material had given us; it had made it clear that steel embedded in Portland cement was practically indestructible. All our steel work in our future building should be embedded, therefore, in Portland cement. Mr. Marshall had drawn no fancy picture of what was likely to happen where the iron or steel work in buildings had been left exposed to the action of the air. To pass on for a moment to the second part of his paper, where Mr. Marshall spoke of organic building, he (the speaker) thought we were apt in our admiration of the magnificent qualities of mediæval architecture to over-admire its constructional virtues. We did not know how much real statical knowledge was abroad at that time, but we did know that most of it was the result of experiment from the time the first dome of Justinian's church fell to the collapse at Beauvais, and later still. It was not till we got to the time of Sir Christopher Wren that we found building based upon more certain knowledge. Sir Christopher had, too, a pretty shrewd opinion of some of the mediæval methods of construction, as might be seen in his reports upon old St. Paul's, Salisbury Cathedral,

and Westminster Abbey. Our chief hope for "designing in beauty and building in truth" was in education—the education both of themselves as artists determined for one thing not to scorn science but to learn from it, and also of the public, that we might hope to arrive at a general appreciation and consensus of opinion in art.

Mr. J. H. Markham said he was rather inclined to agree with Mr. Home. He did not think it was undesirable that architects and engineers should work together in the way they did. He (the speaker) failed to see how it could be otherwise. How would an architect, if he studied the ancient methods of architecture and absorbed the principles of design which were therein found—how could he, by the time he had done that, go thoroughly into the scientific questions which must be dealt with by those who carried out buildings on present-day methods? Of course it was essential that an architect should have some idea of the principles and methods to be relied on to cover over spaces, and for other uses; but when he came to the actual calculations necessary to carry out the work it was better to hand over that work to the engineer. Mr. Marshall had a great appreciation and love for ancient architecture and its beauties, and he shared that admiration. He understood Mr. Marshall to deplore the introduction of iron and steel because of the great attenuation of the constructional parts of buildings. He did not see how architects could help themselves, for the method of construction had been introduced, and a man who was building at the present day, and who wanted all the space possible, did not see the advantage of having thick walls when thin would do, if his ground was limited in extent. It was of questionable advantage to bemoan the fact that present-day methods did not allow them to design in the way that the old builders did, for, whether they liked it or not, the present methods would be carried out by someone. It seemed a pity to rule out new methods of construction as being incapable of artistic treatment because they were not like the old methods. In the case of ferro-concrete there had not been sufficient trial, and if they had so far failed in their efforts that was because they had not tried enough, and all that any architect could say was that he, personally, was not capable of solving the problem presented. Someone else might be, and if they did not give the material a fair trial how could they decide? It was like the man rescued from drowning who said he would not go into the water again until he could swim. If they would not tackle the problem until it was solved they not only missed an opportunity, but their work in the material would ever be an eyesore because no attempt had been made to solve the problem. It had been said that buildings of the present day would not last fifty years; that might be true, and he believed that in American street architecture, where commercial ideas, which were rightly deplored, were so much in evidence—more than in this country, perhaps—buildings in prominent thoroughfares were designed to last only about fifteen to twenty years. The requirements would then be different, and it would be advisable from a commercial point of view to pull the buildings down and rebuild them. In such cases he could not see the good of building very solid structures. They had not seen how ferro-concrete would stand the test of time, but they were told that such material improved with age, though that seemed difficult to believe. If that was true of the concrete, then the steel was quite safe, for that which would corrode the steel was kept away from it, and it was adequately protected. Of course, they did not rely on it improving with age, because the concrete was taken at its strength when a few months old, and the calculation was made on that basis; and he did not think they could say that such buildings would collapse under the influence of weather. Allusion had been made to Sta Sophia dating from the VIth century; he believed it should be the Vth century.

Mr. E. Gunn said he gathered that Mr. Marshall, in his imaginative retrospect, intended to imply that that which merely served the need of the moment was not architecture; but the author seemed to reverse that idea in the second part of his paper. He (the speaker) thought that really there were always two kinds of architecture—the transitory and the monumental. Mr. Marshall seemed to be paradoxical; he seemed to say that our architecture (which merely served the need of the moment) was engineering, and that engineering works were destined to last, and were therefore monumental. As to what Mr. Home said, if engineers could and would rely on absolute functional design they would produce something which, if not architecture, would be very near it; it was the fondness of engineers for putting little bits of "ornament" all over engineering structures which so often spoilt their work. There was sometimes a great deal of beauty in a lattice girder bridge or a piece of direct constructional steelwork well carried out. As to such massive and heavy structures as dams and aqueducts and the great engineering features of Roman architecture, the real architecture of the Romans seemed to be bound up with their engineering, and could not be separated. Nowadays it was different, and the engineer's idea seemed to be that someone should make the structure and someone else apply beauty to it.

Mr. J. H. E. Duncan said that the Romans reinforced some of their vaults with bronze rods, and the question of reinforced concrete was a very ancient one indeed, though the reinforcement was not done as the present engineers did it. In 1823 we had the earliest information on modern reinforcement, and the system was not a very suitable one. The modern industry began about the year 1856, when a floor was designed in ferro-concrete. Since then there had been many patents, both in this country and others, especially in France. St. Paul's Cathedral furnished another instance of reinforced concrete, and it had to do with the question of whether reinforced concrete would last. At the base of the dome of St. Paul's there was a big chain embedded in concrete, and some time ago Mr. Somers Clarke cut down to the chain to see the condition of it, and he found the condition was perfectly good, the chain being as bright as when put in. That afforded some idea of the condition of reinforced concrete work when properly carried out.

The Chairman, in putting the vote of thanks, said the last speaker had referred to a very important matter, *i.e.*, the life of reinforced concrete. There was nothing new under the sun. He was reading the other day that the first taxi-cab was known in the IIIrd century B.C. in China, and it seemed to be a fact that we never got an invention that was quite new. They had had something of an attack on reinforced concrete construction from Mr. Marshall, and generally it was the other way. What Mr. Home said as regards engineers and architects was very true, and no doubt the architect occasionally interfered disastrously in the works of engineers, as we had seen in several instances in London; and, on the other hand, there were occasions when the engineer had interfered with the work of the architect. He had had a communication during the last few days from a member of one of the principal engineering societies, suggesting meetings, etc., between the two professions in order to establish a better feeling and a better means of differentiation between the two classes of work which were done, so that the engineer should not overlap the architect and the architect should not overlap the engineer. That, of course, would be all for the good if it could be done. He thought there was a future for the material, however much they disliked it; and he thought we lived too near these new materials to appreciate what they were and what could be done with them. This had an effect on design, as was seen in the case of American buildings put up to last only a short time, though in New York there was the good reason that, land being so limited, and more space being wanted, they could get a larger area by building thin walls and higher buildings. In London we had not the same excuse. Mr. Marshall had evidently made up his mind that tradition stopped at a more or less definite time at the end of the XVIIIth century; since then there had been no tradition worth speaking of, and that, as far as Mr. Marshall could see, there was no likelihood of it coming again. He (the speaker) questioned whether tradition had stopped. The period during which we went through an eclipse of art in England was very well marked, but [he thought we were emerging from that now. It would be quite impossible to continue the advance in building, in construction, and not in what was really more important—especially to those who followed us—the arrangement of our buildings, our internal plans; and this was what we should be judged by as much as by the elevation, and perhaps more, by anyone who, in the future, judged our work as we judged the work left at Mycæne and Pompeii. It was the ground plan that was the key of the whole situation, and architects had gone on improving in their planning steadily for many years, and it was inevitable that we should do so; conditions changed, and we must show them in the planning; the outside was not equally important. The two things were not to be compared, and must be kept separate when we talked of history. The evolution in building was, he believed, inevitable, and we must go on growing from one thing to another. We had now this new material of ferro-concrete, and even the engineers declared that it had come upon them as a surprise. He believed it had come to stay, and that when they had made it the subject of their teaching and training, and when there had arisen men who thoroughly understood the use of the material, we should see ferro-concrete architecture. He did not think that anyone had a right to say that architecture was not possible with the material when they did not understand its use. If that were justified, then we should have had no buildings worth the name. In the past men had had to deal with new materials, and they had done something with them. As an instance of his meaning he could mention ships. The difference between a sailing ship and a modern ironclad was as great as the difference between Westminster Abbey and the new Post Office. The Post Office was in its infancy as a piece of design, and so was the first ironclad, the old "Merrimac," compared with the "Dreadnought. The old sailing ship and the modern ironclad were both splendid in their way, and there was no reason why there should not be as fine things in ferro-concrete as there had been in stone and brick in the past.

The vote of thanks having been heartily agreed to,

Mr. Marshall, in reply, said he had been slightly misunderstood here and there, and his paper was not entirely against the introduction of ferro-concrete; but we must be careful what we did with the material. Our system of education must be regulated either to take it in hand thoroughly or leave it. Mr. Home referred to the use of ferro-concrete for certain parts of buildings, and he was quite in agreement with that—in the upper parts of buildings, for instance, where lightness was required. But we were using it now for every part of a building, which was quite a different thing. He had been surprised to hear very little reference to architecture as an art. Of course, our ideas of the beautiful might be, and no doubt were, in course of transformation, and the illustration of the sailing vessel and the ironclad seemed to denote that. We got into a train of thought which made it difficult for us to think of things as they

were thought of in the past. If his paper were read carefully it would be seen that he considered that the ferruginous method of construction should have full consideration, for he believed there were many possibilities in regard to it. The object of his paper had been to remind the student that it is the duty of the architect to meet the wants of the hour without prevarication, while maintaining as far as possible that privilege of the artist, which was not, he believed, claimed by the engineer. The styles of the past had seen their day, and had nobly fulfilled their use, but they had still many lessons for us. The ferruginous method of construction might eventually lead us back to that path of architectural rectitude we seemed to have missed, and a future generation may be able to invest the new material with a sublimity and beauty hitherto undreamt of. Receding frontages, rising tier above tier, with hanging gardens against backgrounds of gleaming faïence, would certainly be an improvement on the skyscraper that now casts its gloom over our cities. And, in connexion with designs in ferro-concrete, a most important point was the fact that it was very well adapted for buildings with projections. It seemed to him to be a mistake to make a huge façade of ferro-concrete without light and shade. In some of his churches Wren employed timber for his domes, which was a light form of construction, and the walls around—skilfully arranged—were almost as thin as any ferro-concrete method. It ought to be very encouraging to students to know that we now had a material that might possibly lead to something quite apart from tradition.

The meeting then terminated.

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## "THE RISE AND FALL OF ARCHITECTURE."

This was the title of the Architectural Association play for 1909, which was given on Wednesday (ladies' night), and again on Friday (members' night), of last week, at the King's Hall, Covent Garden, W.C., before large and very enthusiastic audiences, who lost no opportunity of applauding the many "points" or "hits" of professional interest made during the performance. The play, which was presented by the Musical and Dramatic Society of the Association, was "interspersed with music by Mr. Claude Arundale-Kelly, and bits of rather ancient chaff by the editors of the *Purple Patch*," and the editors of that vivacious and highly-interesting publication explain in the current issue that they had "conceived the fantastic idea of attempting to adapt the matter of a pageant to the spirit of a musical burlesque . . . and have tried to use the glories of the Architectural Past to emphasise the evils of the Architectural Present." There will probably be differences of opinion as to whether the attempt was successful or not; the pageant effects were often admirable, and the spirit of musical burlesque was certainly not absent; but though the "evils" of the architectural present were obvious enough, the "glories" of the architectural past were not so apparent. But the play was very well staged and acted, no doubt the result of many and careful rehearsals; and the scenery, for which Mr. E. A. Rickards was responsible, was appropriate and up-to-date. The play was produced without actresses this year, and the chief characters were Mr. G. B. Carvill (who successfully appeared in most of the scenes in various guises—jester, moralist, philosopher, the Purple Patch, etc.); Mr. C. Wontner Smith (who ably personated several very different characters); and Mr. F. D. Clapham, as the ubiquitous architect, who is Ari-Ba (the first architect) in the first act, and who was intended to typify presumably the characteristics of the average architect in various ages. The intentions of the authors are, to some extent, expressed by the Prologue, Mr. Carvill, as follows:—

"In Act I. we show that 'Art' isn't wanted at the start, simply 'cheek'!
Then, as Art becomes a fact, we require a little 'Tact'—just a streak.
But when Art its summit reaches, true 'Forbearance' great it preaches;
Act II. will show you symptons of its wane,
Dilettanteism spread—in scene V. our Art is dead;
Try 'Advertisement' to set it up again."

In the development of the "plot," so far as there is any, these ideas are given effect to, and some good points are made by the authors. Three of the best scenes are Scene III.—Act I, an Arbitration Court on the Acropolis; Scene I., Act II.—the roof of the south transept of the Church of the Abbey of St. Denys and St. Pierre, Blastbonbury, in the County of Barsetshire, *circa* 1400 A.D.; and Scene III., Act II.—Olympia, exhibition of Ideal Home Competition Drawings. In the Arbitration scene the architect sits in judgment on the builder who is charged with using bad materials, and for delay in carrying out his work; in his defence the builder says:—

"Delays of some months please forget:
What are months, when a building's constructed
To last through the centuries yet?"

Some amusing play is made with expert witnesses, clerks of works, foremen, and others, and the anxiety of the arbitrator to decide against the builder, who brings a counter claim, even before hearing his defence—a state of affairs possible only in an extravaganza of this kind. In Scene III., Act II., the winner of the competition is one Snatchall—in a previous age Callicrates, the architect of the Parthenon and President of the Royal Institute of British Architects of the period. He is a type of the pushful, advertising, architect said to exist at the present time, and as the result of his success he receives dozens of orders, though in most cases the clients, in giving their more or less ridiculous instructions, stipulate that "Messrs. Sparing & Flashy are to decorate." He also receives a visit from Mr. Knobody, of "Knews in Bits," who wants to write an appreciative article about the successful architect, and to be "nasty about all the others"; and this the architect promises to write himself and send to the editor. The Purple Patch in this scene plays the part of the special guardian angel of all architects, and in conversation he says he would "guide through the Slough of Despond, over the morass of commercialism, to a safe haven on the other side, where they may practice their art in peace." And Sparing says he will willingly build them a comfortable home of rest at his own expense, where they might rest and slumber for the remainder of their lives, and then his one remaining fear of competition would have departed and profits would encircle his enterprise. Snatchall says it is too late, for architects were adopting Sparing's methods. Sparing tells the architects that with a little use of his persuasive powers those who had commissioned his firm to decorate and furnish the houses the architect was going to build for them might even let him build them as well. The Purple Patch suggests that when the public wake up the architect will come into his own again, and that architects must wake them up. Things were a little better perhaps already, but the advance in public appreciation had been slight. He sings a song of warning, and says:—

"Oh! you architects, you must be going blind.
Can't you see you're getting left centuries behind?
Your antiquated methods do not pay.
The wholesale art-providers soon will have you on your knees;
Your practice is already growing smaller by degrees."

And the last words are with Sparing, who sings:—

"And oh! you architects, a long good-bye to you;
While you talked of Art
We played the part
And took the practice too."

In addition to Messrs. Carvill, Wontner Smith, and Clapham, the following took part in the play—*i.e.*, Messrs. J. B. Scott, Stanley M. Spoor, H. M. Whitehead, F. Harrild, F. Harrild, jun., W. Wonnacott, W. O. Langbein, A. Needham Wilson, R. P. Oglesby, Alec Smithers, S. R. C. C. Buss, and T. L. Dale.

## THE ARCHITECTURAL ASSOCIATION SIXTH SPRING VISIT:

### MESSRS. R. MORELAND & SON'S STEELWORKS, SILVERTOWN, MARCH 27, 1909.

THIS proved one of the most attractive visits ever organised by the Architectural Association, over 150 members taking advantage of the opportunity of inspecting an up-to-date plant for the preparation of constructional steelwork. Messrs. Morelands had kindly arranged to have all their machines running, and it was certainly most impressive to observe the facility with which it is possible to deal with large girders and other structural members by modern methods. It was felt to be a matter for satisfaction that with only two exceptions the whole of the machines and tools about the works bore British makers' names.

The works are situated on the ancient bed of the River Lea, and are intersected by the old Dagenham Sea Wall, behind which the level is below high-water mark. An embankment has been formed level with the sea wall, next the Thames, where material is unloaded direct by means of the projection over the river of one of the overhead gantries, which run in three parallel series at right angles to the waterside. Electrical energy, obtained from the Borough Electricity Works, is used to obtain power for the various machines, and its advantages in ready transmission to any desired point, appear incontestable.

Each of the three gantries is equipped with electric cranes capable of lifting a load of six tons at 20 ft. per minute, of traversing at 70 ft. per minute, and travelling at 150 ft. per minute. The steel when first unloaded is deposited in the stockyard on the river embankment, where are machines for straightening the sectional material. From this point it is drawn to the various shops as required, all the machines being so arranged that the necessary operations are in sequence, and the material eventually arrives in the delivery yard in a finished state.

A template floor, 104 ft. by 40 ft., for setting out work full size, adjoins the gantries, and is equipped with woodworking machinery for the preparation of patterns. There is also a store for standard patterns, cleats, bolts, rivets, etc.

The steel sections are cut up by numerous saws of band and circular types, which present the advantage over other methods that accuracy, both of finish and dimensions, is obtained. Shearing machines for plates, and punching machines were also inspected; the latter, it was stated, were gradually being superseded by drills, as the time taken in assembling, marking off, and punching is so much that, since the introduction of high-speed drills, both time and expense are saved. A large number of high-speed drills, both vertical and horizontal, were seen, each worked by an independent five horse-power motor. Machines for facing-up stanchion caps and bases, and hydraulic riveters and bending presses were also working. The power is obtained from a hydraulic accumulator, pressure being generated by pumps driven by a 75 horse-power motor.

In a recent extension are lathes, saws, planers, millers, and grinders for making solid steel columns and other engineering work. It is interesting to note that the contents of this building practically double the load on the foundations. Numerous forms of foundation construction have been employed in the past, including various applications of piling and isolated concrete-steel bases. As a result of the experience gained, this latest extension has been placed upon a steel and concrete raft, with ribs 3 ft. 6 in. deep, and 2 ft. wide, dividing the whole into panels 15 ft. square and 16 in. thick. The load on the ground due to building and contents, is equal to 6½ cwts. per foot, and no settlement has yet taken place. Past results having convinced the firm of the unsuitability of corrugated iron for use in this locality, the sides of the new building have been formed of Frazzi, and

the north-light roof is covered on its southern slopes with tiles. The building is allowed as a temporary structure by the West Ham Corporation.

## TOMKINS'S ALMSHOUSES, ABINGDON.

AMONG the numerous sets of charities for which Abingdon is noted, are the almshouses situated in Ock-street. They comprise eight dwellings built in the form of a quadrangle, of which one end is open to the street. On a large recessed tablet is the following inscription:—

"These almshouses were built in the year 1733 by the order of Mr. Benjamin Tomkins the elder, of this town, and according to the form prescribed by him to his sons, Mr. Benjamin and Mr. Joseph Tomkins; who were executors to his Will and Testament, by which he gave sixteen hundred pounds, to endow the same for four poor men and four poor women for ever."

This foundation has been further endowed by Mr. W. F. Smith, of Abingdon.

SIDNEY HEATH.

## NOTES FROM PARIS.

AT its last sitting the Académie des Beaux-Arts awarded the Achille Leclère prize to M. Georges Bellon, a pupil of M. Redon. The subject set for the competition was "A large Casino for a seaside resort."

It is proposed, on the suggestion of the "Vieux Paris" Committee, to instal, in a building connected with the cathedral of Notre Dame, a museum in which all fragments remaining from successive restorations and repairs of the cathedral should be collected and preserved. To this collection could be added photographs and engravings illustrating the history of the cathedral.

The "Vieux Paris" Committee has also been much disturbed by a rumour of the intended demolition of the "Pavillon de Hanovre," the graceful building at the angle of the Boulevard des Italiens and the Rue Louis le Grand, which dates from the latter part of the reign of Louis XIV. In connexion with this matter, the Committee has demanded that all the old street façades in Paris, of any importance, should be classed as "Monuments Historiques," with an indemnity paid to the proprietors for undertaking to preserve them untouched.

The work has been commenced for setting up in the garden of the Palais Royal M. Rodin's monument to Victor Hugo, which was originally to have been placed in the Luxembourg garden.

## SMOKE ABATEMENT EXHIBITION, SHEFFIELD.

THE following is the list of awards at this exhibition:—

*Heating Appliances.*

Closed and ventilating stoves:—George Wright, Ltd., 1st Class Diploma.
Register stoves with barless fires:—H. W. Micklethwait & Co., 1st Class Diploma.
Fuel economiser for domestic fires:—David Smith, 2nd Class Diploma.
Open gas fires:—John Wright, Ltd., 1st Class Diploma; Wilson's & Mathieson's, Ltd., 2nd Class Diploma.
Gas Water Heaters:—John Wright, Ltd., 1st Class Diploma; Wilson's & Mathieson's, Ltd., 1st Class Diploma.

*Cooking Appliances.*

Gas cookers:—Davies Gas Stove Company, Ltd., 1st Class Diploma; Richmond Gas Stove & Meter Company Ltd., 1st Class Diploma; John Wright, Ltd., 1st Class Diploma; Wilson's & Mathieson's, Ltd., 1st Class Diploma.

*Gas Engines.*

National Gas Engine, Thomas A. Ashton, Ltd., 1st Class Diploma.
W. J. Bates & Co. Ltd., 1st Class Diploma.
Crossley Brothers, Ltd., 1st Class Diploma.
Hornsby Stockport Gas Engine, Roper & Wreaks, 1st Class Diploma.

*Boilers, etc.*

Babcock & Wilcox, Ltd., 1st Class Diploma.
Sterling Boiler Company, 1st Class Diploma.
Coking stoker:—James Hodgkinson (Salford), Ltd., 1st Class Diploma.
Forced draught furnace:—W. R. Wills, 1st Class Diploma.
Underfeed stoker:—W. R. Wills, 1st Class Diploma.
Flueless gas radiators:—Davies Gas Stove Company, Ltd., 1st Class Diploma; Wilson's & Mathieson's, Ltd., 1st Class Diploma.
"Fumicide" Smoke Consumer:—Herbert Bennett, 2nd Class Diploma.
Smoke consumer:—Blackney & Oran, 2nd Class Diploma; A. E. Blizzard, 2nd Class Diploma.
Incandescent Heat Company, 2nd Class Diploma.
Smoke Consumption (Cowper Coles Patent), 2nd Class Diploma.
Victoria Furnace Company, 2nd Class Diploma.
Victory Smoke Consumer and Fuel Economiser, Ltd., 2nd Class Diploma.
Firebars:—Whitehead Brothers, 2nd Class Diploma.
Gas steam radiators:—Richmond Gas Stove and Meter Company, Ltd., 1st Class Diploma; John Wright, Ltd., 1st Class Diploma.
Talbot's Patent Air Purifier:—Ibbotson Brothers & Co., Ltd., 1st Class Diploma.
Dust extracting plant:—Jelly & Co., 1st Class Diploma.

*Electricity.*

Apparatus for small installations:—Hattersley & Davidson, 1st Class Diploma.
Domestic heating and cooking appliances:—Sheffield Corporation Electric Supply Dept., 1st Class Diploma.
Trade and municipal appliances:—Union Electric Company, Ltd., 1st Class Diploma; Siemens Brothers & Co., Ltd., 2nd Class Diploma.

*Testing Appliances.*

Thermometers and pyrometers:—Siemens Brothers & Co., Ltd., 1st Class Diploma.
Tintometers:—Tintometer, Ltd. (J. W. Lovibond), 1st Class Diploma.

## THE INSTITUTE OF BUILDERS.

THE twenty-fifth annual general meeting of the Institute of Builders was held at 31 and 32, Bodford-street, Strand, W.C., on the 25th ult.

The annual Report was submitted, and the audited accounts and balance-sheet for 1908 were adopted, and the following gentlemen were elected:—

President—Mr. W. F. Wallis, J.P. (Maidstone).

Vice-President—Mr. R. W. Neill, J.P. (Birmingham).

Treasurer—Mr. W. Shepherd (London).

Hon. Auditor—Mr. F. N. Cowlin (Bristol).

Executive Council—Messrs. E. J. Strange (Tunbridge Wells), Ernest J. Brown (London), G. Bird Godson (London), and Wm. Lawrence, jun. (Waltham Cross).

A hearty vote of thanks was passed to Mr. J. Carmichael, J.P., for his able occupancy of the presidency during the past year.

TomKins' Almshouses, Abingdon

Sidney Heath

APRIL 3, 1909.

## TO CORRESPONDENTS.

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## MEETINGS.

FRIDAY, APRIL 2.

*Royal Sanitary Institute (Lectures on Sanitary Science).*—Mr. J. E. Worth on "Scavenging, Disposal of House Refuse." 7 p.m.

*Architectural Association Debating Society.*—Mr. G. H. Imison on "Decorative Metalwork." 7 p.m.

*Institution of Civil Engineers (Students' Meeting).*—Mr. W. E. R. Gurney on "Reinforced Concrete on Railways." 8 p.m.

SATURDAY, APRIL 3.

*Royal Institution.*—Professor Sir J. J. Thomson, M.A., on "Properties of Matter."—VI. 3 p.m.

MONDAY, APRIL 5.

*Society of Engineers.*—Mr. Ernest R. Matthews on "The Corrosion of Steel-Reinforcement in Concrete." 7.30 p.m.

*The Incorporated Clerks of Works' Association (Carpenters' Hall, London-wall).*—The twenty-seventh annual meeting. 7.30 p.m.

*Royal Society of Arts (Cantor Lectures).*—Mr. Gerald G. Stoney, M.Inst.C.E., on "Steam Turbines."—III. 8 p.m.

TUESDAY, APRIL 6.

*Royal Society of Arts (Colonial Section).*—Hon. J. Ferguson, C.M.G., on "Ceylon: Its Industries and Material Progress." 4.30 p.m.

*Institution of Civil Engineers.*—(1) Paper to be further discussed, "Construction and Wear of Roads," by Mr. Arnulph Mallock, F.R.S. (2) Time permitting, paper to be read, "The *New York Times* Building," by Mr. C. Tyler Purdy, M.Inst.C.E. 8 p.m.

WEDNESDAY, APRIL 7.

*Royal Archæological Institute.*—Mr. W. H. St. John Hope, M.A., and Mr. Harold Brakspear, F.S.A., on "Excavations at Haughmond Abbey in 1906," with lantern illustrations. 4.30 p.m.

*Carpenters' Hall, London-wall (Lectures on Arts Connected with Building).*—Mr. J. Starkie Gardner, F.S.A., on "Decorative Iron Work." 7.30 p.m.

*Edinburgh Architectural Association.*—Associates' business meeting.

*Builders' Foremen and Clerks of Works' Institution.*—Ordinary meeting of the members. 8 p.m.

*The Royal Sanitary Institute.*—Discussion on "River Pollution—its Ethics, Æsthetics and Hygiene," to be opened by Mr. W. D. Scott-Monscrieff. 8 p.m.

*Institution of Civil Engineers.*—Students' visit to the Chingford Reservoir Works of the Metropolitan Water Board.

FRIDAY, APRIL 9.

*Glasgow Architectural Craftsmen's Society.*—Business meeting. 8 p.m.

SATURDAY, APRIL 10.

*Edinburgh Architectural Association.*—Associates' visit to St. Catherine's and St Margaret's Convents.

# Illustrations.

## VICTORIA MEMORIAL HALL, CALCUTTA.

THIS great building is still, some years after the design was made and accepted, only commenced, and its progress has been delayed for some time owing to what appears to have been a misconception on the part of the Trustees in regard to a danger arising from the nature of the foundations, which seems rather imaginary than real, and as far as it existed had in fact been fully provided against by the architect.

As the subject has been much discussed lately, it is an opportune moment to give an illustration of the design along with Sir W. Emerson's description of the difficulties arising out of the nature of the foundations coupled with other circumstances over which he had not had complete control.

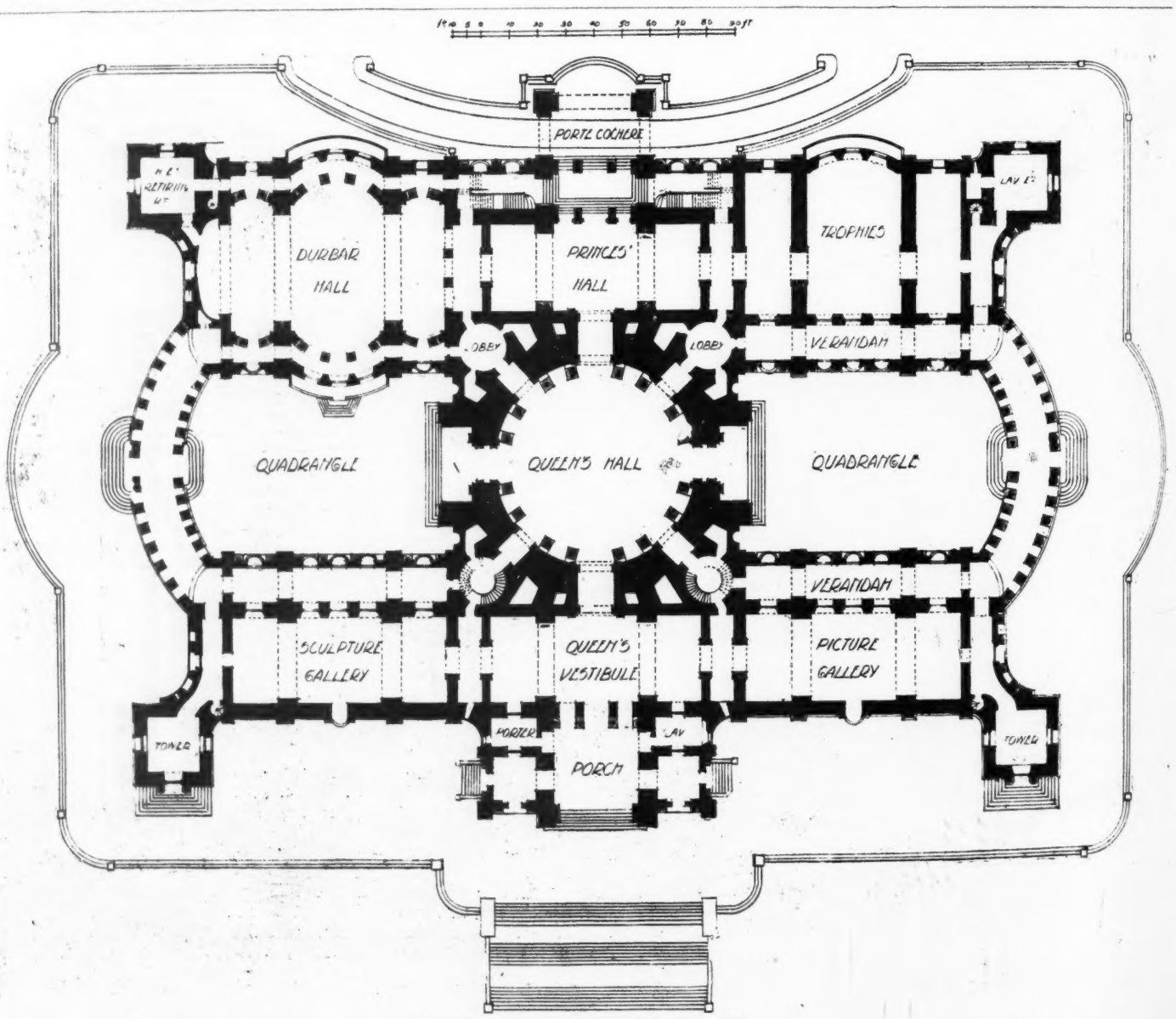
We have printed the view in two colours in order to give something of the effect of atmosphere. The following particulars are communicated by the architect:—

"The delay in regard to proceeding with the superstructure has been caused by a settlement of the foundations under rather peculiar circumstances, the particulars of which may be of considerable interest to architects.

The soil of Calcutta is notoriously bad for building operations, being a fairly firm alluvial deposit to a depth of 8 ft. to 12 ft., and below that wet bluish clay and silt to an unknown depth. In consequence many of the large buildings in Calcutta have suffered.

It has been proved by other buildings that 1½ tons on the superficial foot of soil at a depth of 4 ft. or 5 ft. will sink some 6 in. or 8 in.

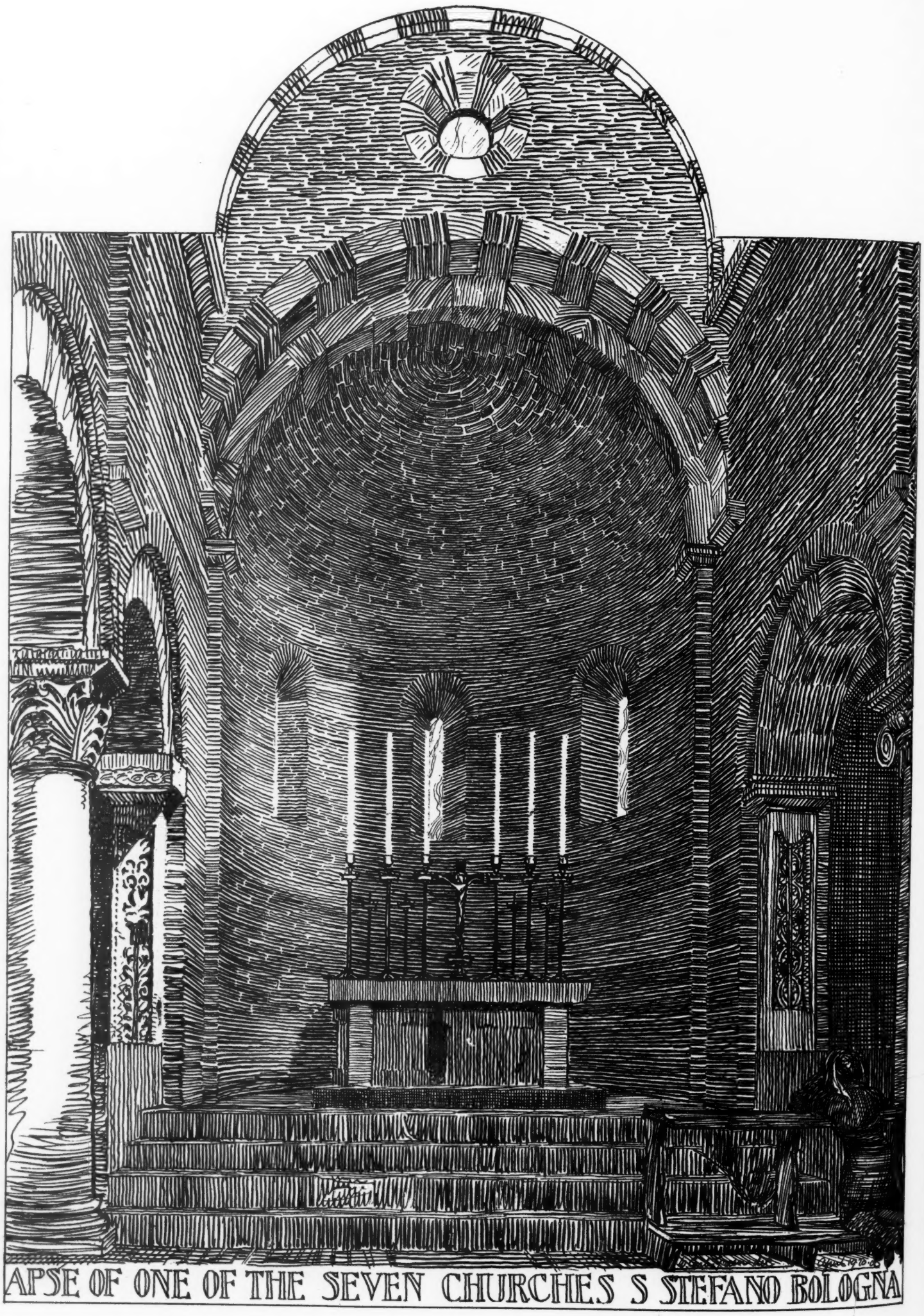
In this particular case the settlement was mainly due to uneven loading, caused by the arrangements made in Calcutta for the ceremony of the laying of the foundation-stone by




*Victoria Memorial Hall, Calcutta. Plan.*

THE QUEEN VICTORIA MEMORIAL HALL, CALCUTTA.—Sir William Emerson, F.R.I.B.A., Architect

E QUEEN VICTORIA MEMORIAL HALL, CALCUTTA.—Sir William Emerson, F.R.I.B.A., Architect.



APSE OF ONE OF THE SEVEN CHURCHES S STEFANO BOLOGNA

Well Head Bologna. Pal. Bentivoglio.

W. Curtis Green del

Photo by Sprague & Co., Ltd., London.

MESSRS. SELFRIDGE'S PREMISES, OXFORD ST ET.—MR. R. FRA

RD STREET.—Mr. R. Frank Atkinson, F.R.I.B.A., Architect.

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H.R.H. the Prince of Wales on January 4, 1906; also probably in part owing to the close proximity of two large tanks, which are much deeper than the foundations, and which should no doubt be filled up.

After the foundations were put in, at a depth of 4 ft., and the main walls built to the height of the terrace level, 10 ft. above the ground, and the central block 14 ft. high, the weight under the central block, which is 142 ft. by 141 ft. square, was a little over 14 cwt. per foot super. on the soil, and under the corner towers and main walls a little under 9 cwt. per foot super. on the soil.

The foundations were then filled in with earth to the height of 10 ft., level with the top of the walls, because it was declared that the water lying in the compartments during the rains would certainly cause an outbreak of plague and cholera amongst the native workmen; this, no doubt, was a fallacy.

Then, for the ceremony of laying the foundation-stone, platforms of earth 150 ft. long, 40 ft. wide, and 5 ft. 9 in. and 7 ft. 6 in. high, were erected on all four sides of the central bed over the projecting footings and spreading concrete, and the central inverted dome was also filled up with earth to arrange pavilions and seating for the accommodation of 2,500 persons.

This earth weighs 99·5 lb. per cubic foot. This brought the weight under the sides and centre of the central block up to 26½ cwt. at sides and nearly 29 cwt. in centre, exclusive of pavilions and seats, while the weight under the four corners and main walls was only 10 cwt. and 11½ cwt.

Thus there was three times the weight in and about the centre to that at the ends of the building, resulting in a general movement and the sinking of the centre portions some 5 in.* The movement showed itself directly the platforms were erected, again two days after the ceremony took place.

All the platforms and earth filling to foundations were removed by the order of the architect immediately on his arrival in Calcutta shortly after the foundation-stone was laid.

The principle adopted is to get, as nearly as possible, the same total load on each part of soil under the concrete at the same time, so that it should sink evenly.

In many of the Calcutta buildings where heavy portions had to be erected, instead of spreading the bed of concrete the foundations were taken below the alluvial crust and a greater depth of concrete put in, thus placing greater weight on the weaker subsoil. The result has been that in some cases a sinkage of as much as 2 ft. has taken place.

The chief difficulty in building will be to erect each portion in proper ratio to the area of the concrete under, so as to obtain equality of pressure throughout.

The weights have been carefully calculated, and where a little over 30 cwt. per foot reduced to that weight, and, in deference to instructions from the trustees, acting on the opinion of their advisers in Calcutta, the weight on the central block has been reduced to below 29 cwt., as they state that the same weight per foot over a large area sinks more than the same weight per foot on a smaller area, which is contrary to the opinion of most engineers and architects, and seems difficult to understand.

Other suggestions have been made in Calcutta, namely, that in view of the earthquake in San Francisco this building should be erected in the American manner of steel construction, with marble facing hung on; also that the foundations should be segregated, cutting them right through in many places, where the heavier parts of the structure occur. These steps have, however, been considered inadvisable.

With the advice of eminent engineers in London the architect has proposed to lay steel girders along the walls and around the central block to equalise any possible unevenness of soil or pressure, also to build vertical strips at certain points in sand, so that any movement would show at those places, and when settlement has ceased to remove these portions and rebuild in mortar."

Had such a settlement occurred with the bare weight of materials, the heaviest load being only something over 14 cwt. per foot super. on the soil, there might have been a difficult question to solve, as to whether the site was ordinarily good for Calcutta. The sinkage, under 26 cwt. to 29 cwt., proves it to be much the same as usual in Calcutta, or indeed a trifle better.

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As we are going to press, we see, by a paragraph in an Indian paper, that it has been decided to build on the foundations put in. No doubt it was a difficult and anxious matter for the Trustees to consider.

*This is clearly shown in two sections of the walls which are now before us, in which the line of sinkage of the walls is drawn out to scale.—ED.

## MESSRS. SELFRIDGE'S PREMISES, OXFORD-STREET.

WE give a view of this fine and monumental building, from a photograph specially taken for the *Builder*. Mr. R. Frank Atkinson is the architect.

The building was fully described in detail in the account of the visit made to it by the members of the Architectural Association, reported in our issue of January 23.

We must correct an inaccuracy of expression which occurred in a "Note" in our issue of March 20, at the time of the opening of the building, mentioning the columns "as a stone casing in the guise of a column," an implied contradiction of fact which escaped our notice at the time. The columns are solid stone and carry their proportion of the superstructure, and were so described in our previous report of the visit of the Association.

In regard to another criticism, the Architect writes:—

"Regarding the interior, you refer to the same Ionic caps doing duty on every floor; this is hardly so, as they only occur where seen up the light wells, and this was a choice of evils—either having properly proportioned Doric columns over Ionic, or a modified Ionic over Ionic. The latter was chosen as being the lesser evil; the upper columns could not be reduced in diameter on account of the fire-resisting casing to the steelwork, and to make the ground floor columns Doric would have made them too large for commercial purposes."

## S. STEFANO, BOLOGNA.

AN apse of one of the seven churches forming the ancient church of S. Stefano in Bologna is shown in the accompanying sketch.

A survey of S. Stefano would make a most interesting and valuable study. It is a unique collection of churches forming the most ancient ecclesiastical edifice in Bologna, and one of the oldest in Italy. The plan is a labyrinth not easily grasped in going over the building. As a piece of architecture it is a fine example of the uses and combinations of brick, marble, and stone, and some interesting colour effects are obtained with crude-coloured earthenware. The windows of the church shown are glazed with thin slabs of onyx marble. The walls are unplastered brick.

## WELL HEAD, PALAZZA BEVILACQUA.

THIS well head stands in the most magnificent courtyard of any private palace in Bologna, and forms in itself a charming feature silhouetted against the dark shadow of the colonnade.

This drawing, and that of the apse at S. Stefano, were among sketches made by Mr. W. Curtis Green during a tour in Italy.

## THE CONCRETE INSTITUTE:

### CONCRETE IN ARCHED BRIDGE CONSTRUCTION.

THE fourth general meeting of the Concrete Institute was held at the Royal United Service Institution, Whitehall, on Thursday, March 18, Mr. A. Ross, M.Inst.C.E., presiding.

Mr. E. O. Sachs, Chairman of Executive, announced that the membership, which was 551 at the last meeting, was now 585.

Mr. E. P. Wells, J.P., Hon. Treasurer, then read a paper, illustrated by lantern views, entitled "Concrete in Arched Bridge Construction." The materials used in the construction of arches in this country, the lecturer said, had been confined in the past to stone, bricks, iron, and steel, and it was seldom that any other materials were used, unless it were for arches of very small spans, many engineers and architects, for reasons of extreme caution and safety, being indisposed to use concrete. But the use of Portland cement concrete was more satisfactory, not only as regards strength, but also as to first cost, an item which, at the present day, had in many instances to be seriously considered.

One of the principal reasons why concrete had not been more often used in this country was the fact that very few engineers had ever seriously experimented with this material; they had only considered it good enough for retaining walls and foundations, and some engineers did not place much faith in it, even for the latter work; and where it was used it was very often made abnormally strong for fear of accidents happening.

The lecturer knew of cases where the loads on the foundations did not exceed 2 tons to 2½ tons per square foot, and the concrete was made in the proportion of 4 to 1; whereas this material would carry with perfect safety 100 tons per square foot two months after being made, assuming, of course, that all the materials were good and clean and the Portland cement was of the ordinary best quality made and not adulterated.

There was a homogeneity about concrete, when properly made, that was not obtained where bricks or stone were used; and those who had had to pull down structures built of either stone, brick, or concrete, the lecturer thought, would agree with him that concrete was not the material he would prefer. His experience was that good concrete well rammed was a most difficult material to break up when made *en masse*; and if by any possible chance iron had been used in combination, then it required dynamite or some other explosive to shatter it.

The lecturer explained that he intended to confine himself principally to pivoted arches, which were theoretically and practically the only form of plain concrete arches that ought to be constructed, and he would show how pivoting at both the springings and centres came to be adopted.

Previous to the adoption of the pivot at both the springing and centre of the arch, it was felt by German engineers that some method should be adopted whereby the curve of equilibrium could be absolutely confined within the centre third. It was well known that in a stone arch it was almost impossible to ascertain where the curve of equilibrium would run, as everything depended on perfect construction, especially in the grouting of the joints, etc.; any defects in grouting up would cause an alteration in the curve of equilibrium, and in all probability might endanger the safety of the structure. It was this difficulty in bedding stones of large area that had compelled engineers to put such a large amount of material in stone arches so as to be on the safe side.

To show what effect settlement had on a stone arch the lecturer called attention to the shore span of Waterloo Bridge on the Surrey side, where it was found upon examination that the abutment moved about ¼ in., the result being that the joints opened at the keystone, and the whole thrust of the arch passed through a few inches of the extrados; this had caused the voussoirs to spall, and a further movement of ¼ in. might cause serious mischief to this national monument.

Some years ago a bridge was constructed in Germany where mortar joints were dispensed with, and in place thereof sheet lead was used, each piece of lead being made the area of the centre third and fixed on the centre third of the stone. This overcame the difficulty to some extend, as the curve of pressure was compelled to pass through the centre third; but this method of construction was expensive, as the arch stones had to be very carefully dressed to an even thickness, so that all joints were linable throughout, or the thrust in the arch would have been very unevenly distributed. The lecturer believed only one bridge on this principle was constructed; but another bridge was built (viz., at Kirchheim) where

only lead was used at the springing and centre, covering about one-sixth of the cross-sectional area of the arch. It was left to the late President von Liebbrand, the Chief Engineer to the State of Württemburg, to adopt the method of pivoting in its application to the concrete and stone arches; and the adoption of this principle had enabled the State of Württemburg to erect concrete bridges of large spans all over the country, where the use of stone would have been undesirable on account of cost.

The first pivoted concrete bridge from the design of the late President von Liebbrand that was constructed in Württemburg was a large one, viz., 164-ft. span, and was the pattern in respect to facilitating erection, reducing the dimensions in the arch, and the use for the first time of the pivot at the springings and centre, which since then had been invariably adopted for concrete arch construction on the Continent, excepting those cases where the concrete had been reinforced with steel, and the arches made with fixed springings and practically continuous from abutment to abutment.

*Construction of Concrete Bridges.*

The lecturer then proceeded to describe the construction of a concrete bridge having a span of 150 ft. with a rise of 19 ft.; this bridge, the dimensions of which he gave, was strong enough to carry the heaviest possible vehicular traffic as also the heaviest railway traffic, and to carry a load of over 3 cwts. per foot super on one half, with the other half unloaded, and all this without the use of steel in its construction; but if steel were used then the loads could be very materially increased.

The principal reason why these concrete bridges were so safe under unequal loading was due almost entirely to the pivots at the springings and centre, which compelled the curve of pressures to pass through the same, the only sensible variation in the curve being at the haunches; even the loading given would not in any case alter the curve so that it passed above or below the middle third. Such being the case, it would be observed that no part of the arch could be in tension; but should such a thing happen theoretically, the spandril walls, by their great rigidity, would prevent any distortion of the arch; and, if the spandril walls and tables were reinforced, it would be possible to put a tension of 10 tons to 15 tons in either the extrados or intrados without the structure collapsing or changing its form.

Another advantage that a concrete arch possessed over a brick or stone arch was its homogeneity, there being an absolute lack of joints which were an element of weakness, as was the mortar in the joints; *e.g.*, in the case of a granite arch, $\frac{1}{20}$ the crushing strength of the stone itself if made of lime and $\frac{1}{4}$ the strength if cement grout were used—then why use a material that was stronger than the weakest part?

In designing a concrete arch it would be found necessary to start on the assumption that the thinnest part of the arch, viz., at the centre, is approximately $\frac{1}{30}$ of the span; this you must increase at the springing by about 7 per cent., and at the haunches by about $27\frac{1}{2}$ per cent., to allow at this point for varying loads tending to make the curve of pressures rise or fall either below or above the neutral axis, and so to always keep the said curves within the middle third.

Having then apportioned the sizes of the spandril walls, or spandril pillars, to the loads that the bridge is intended to carry, also the intermediate tables and tables to carry the vehicular and foot traffic, proceed to ascertain the weight of the structure and find the curve of equilibrium for the dead load only; having ascertained that, make it the neutral axis of the arch, and alter the shape of the extrados and intrados by compounding the curves so as to make both equidistant from the neutral axis. The normal condition of a concrete bridge was its dead load, and the greatest stresses were set up by the dead load; so the lecturer considered that, unless extraordinary loads were to be passed over the bridge, it was not necessary to take into account the live load, especially if it were only ordinary or vehicular traffic. If the curves for equally distributed loads and also for one half of the arch loaded were worked out it would be found that the curve of equilibrium at the haunches did not vary more than 3 in. either above or below the neutral axis; in the case of a heavy rolling load, it was only when the load was at the centre of the span, or a few feet on either side of it, that the increased stresses at that point in the arch could be accurately calculated; because nearly the whole width of the arch, from the point under the load to the springing, took up the stresses induced, and the same were reduced to a minimum by the enormous area of arch that they were spread over; the reason why concrete arches were so strong was that the stresses induced by the weights were so well distributed; otherwise there would no doubt be distortion of the arch and great deflection at the centre, whereas in no case where exhaustive tests had been carried out had this been proved.

Under these circumstances it was perfectly permissible to reduce the thickness of the arch until the stresses amount to 36 tons per square foot; but it would then be required to ascertain the positions of the curves of equilibrium for dead load, equally distributed live load, and also for one half of the arch loaded, and likewise for the maximum rolling load placed in the centre of the span; the neutral axis could then be made the mean of all the curves.

The effect of this would be that at the haunches, for dead load only, the compression at the intrados would be slightly increased, and correspondingly reduced at the extrados; the curve of the intrados would not require so much compounding, but would be more segmental in form, unless they were placing excessive dead loads on the haunches, when the curves of pressure would rise, and so enable the curves of the intrados to be compounded and the appearance of the arch very materially improved.

If it were possible in concrete arch construction to make the arch so that the dead load were equally distributed, then the curve of equilibrium would be a parabola; but the appearance of the arch would suffer, though theoretically correct.

In all cases the spandril walls, and also the concrete filling over the arch beyond the spandril walls at the centre, should be bonded to the arch by means of stone figs, or old iron rods, in the shape of bolts, etc., etc., as by this means any separation taking place between the extrados of the arch and the spandril walls could be absolutely prevented, and the cementitious nature of the concrete had not to be depended upon, which was not always desirable unless very great care be taken in roughing the concrete and making the same absolutely clean.

The centres needed for the erection of a concrete arch were similar in every way to those required for a stone or brick arch, with this exception, that less strength was wanted, owing to the fact that a concrete arch weighed less.

Where it was required to construct the whole arch of concrete, and make imitation stone voussoirs, special shuttering must be made. This could be moulded to any desired form; but great care must be exercised in fixing the shuttering and in well strutting the same, so that in making the concrete voussoirs the ramming did not cause the shuttering to bulge. The shutters for concrete voussoirs could be formed out of 2-in. to $2\frac{1}{2}$-in. wood strengthened with rails, etc., the surface exposed to the concrete being machine wrought; but it was not essential that they should be of an even thickness, as a light variation would, when the voussoir was constructed, act as a key. On the top of the laggings the thickness that the concrete voussoirs were required to be formed should be marked off, the shuttering fixed, the faces in all cases being radial to the curve, and care taken to thoroughly well strut the shuttering, so as to prevent undue distortion in consequence of the weight of concrete. After this was done the surface of the laggings should be covered with about 1 in. of 1 part sand to 1 part Portland cement (made dry), and then, as rapidly as possible, concreting commenced; the quicker the concrete was put in and well rammed the stronger and better it would be. When once a concrete voussoir were started it must be finished without a break, and sufficient men should be employed so that, from start to finish, not more than two hours would elapse. When about three-fourths of the voussoir had been finished, the stone figs or iron rods, etc., should be built in for bonding the spandril walls to the extrados of the arch.

After the concrete was set the surface should be covered over with wet sacks, and kept well wetted during the whole time that it is exposed.

It was advisable, when forming the concrete voussoirs, to always place the first voussoir between the points of support of the centres, not over the supports; thus, if any deflection was caused by the weight, it was put into the beam before the remaining voussoirs were made.

In closing in with the voussoirs Nos. 3, 5, 7, 9, and 11 care should be taken that the faces of the existing concrete voussoirs were thoroughly clean and well roughened; and, as the concrete was brought up, neat cement grout or 1 to 1 cement mortar put on the faces of the existing concrete, so that a perfect bond was obtained between the new and the old. When ramming the concrete care should be taken that the existing faces of the voussoirs were not in any way damaged. To prevent this it was advisable to use special hardwood rammers. Lest by any chance the faces of the voussoirs previously put in should be honeycombed, some to 1 to 1 mortar should be used to fill up all interstices previous to the concrete being filled in.

After the completion of the voussoirs Nos. 2 to 12 it became necessary to adjust the granite blocks.

The pivots should be made of the best annealed cast steel, carefully machined all over to uniform thicknesses; the rolling curves should be machined and finished to a dead smooth surface, the pivots being forced into the bearing plates by hydraulic pressure; if it be found that the faces of the pivots were not parallel with the bed-plate, then the back of the same must be remachined.

The granite bearing stones must be recessed for about 1 in. to $1\frac{1}{2}$ in., and the bearing surface bush-axed or (which is preferable) sand rubbed, as it was advisable that there should be no inequalities in the stone to prevent a perfect bearing being obtained.

The stones should be made in about 2 ft. 6 in. lengths, and the pivots should be about 1 in. less in length. The joints for these stones should be about $\frac{3}{4}$ in., and were not to be made until after the final concrete voussoirs were filled in.

Before fixing the pivots in the stones, sheet lead, about $\frac{1}{8}$ in. thick, should be put in the recess in the stones, and the pivots laid in and well hammered with a heavy wooden mall; after which the stones should be fixed in position, and very great care exercised in gauging the distances between the rails so as to ascertain whether the bearing of the two rails is true; any inequality in the position of the stones could be obviated by packings laid on top of the laggings.

After all the stones were in their correct positions, it would be necessary to obtain four screw jacks so as to force the pivots as close together as possible and at the same time put a certain amount of compression on the lead seatings; when this was done, 2 in. square iron or steel bars should be forced between the back of the stones and the concrete voussoirs Nos. 2 and 12, so as to

prevent any movement when the screw jacks are taken away.

In Germany they used ¾-in. bolts top and bottom, placed in the joints of the stones; but by this means very little pressure was exerted, and the bolts had to be left in until concreting was finished, and afterwards cut out, which was a most difficult and very expensive method of procedure; it was, in the lecturer's opinion, one of the principal reasons why there was so much deflection in the arch when the centres were struck, owing to the fact that so little pressure was put on the seatings previous to concreting in.

There was no doubt that concreting exerts a large amount of pressure on the granite blocks, especially when the concrete was made fairly dry and heavy ramming was employed; but the pressure was light as compared to that exerted by four powerful screw jacks.

It was not necessary that the whole of the outer spandril walls should be constructed before striking the centres; but, if there were no urgent reason why the centring should be removed, it was better to let the same remain, as it acted as a staging to enable the masons to set the stones on the spandril faces. But within three weeks after the completion of the final concrete voussoirs it was advisable to ease the centres a trifle, so as to allow a moderate amount of pressure to be exerted on the pivots; where screw jacks were used this could be easily done without in any way setting up vibration in the arch such as takes place when folding wedges are used.

After the centres were finally struck the concrete over the arch, forming the roadway and footway, might be filled in, care being taken to make an expansion joint over the pivots in the centre of the span and also at the springing pivots. In this country a joint ⅛ in. was sufficient at the centre, and the same could be made with soft felt; but at the springings, if the concrete be put in in cold weather, fully ½ in. must be allowed. In forming the roadway, whether of wood paving, granite pitching, asphalt, or macadam, the expansion joint might be ignored, though one must be put in on the footways, especially if the same were made of York paving or concrete.

In order to allow the arch to expand, the outer spandril faces must not be bonded to the abutments or piers, but be recessed into the same so as to allow perfect freedom of action; this also applied to the parapet and cornice, because, if securely fixed, an accident was bound to happen in winter if the bridge were completed in summer, and *vice versâ*.

The lecturer then described some tests on a model bridge of 150 ft. span to a scale of ½ in. to the foot, and a few of the principal concrete bridges that have been erected abroad, commencing with the Coulouvrenière Bridge across the Rhone at Geneva. These were illustrated by means of lantern slides. Finally, the lecturer made extended remarks on the making of concrete and the proper proportions that ought to be used for different kinds of work. The results of many tests and experiments on concrete carried out by the lecturer formed addenda to the paper.

A discussion followed, in which Professor Henry Adams, C. Reid, P. Tomey, H. Brooks, and the Chairman took part.

Professor Henry Adams said that as to Mr. Wells's remarks about concrete in the proportion of about 4 to 1, engineers could not afford to put concrete of that value except in certain cases where the foundations were very thin and spread out and reinforced with metal. With regard to the settlement of arches it was important to have rigid abutments and thin joints, otherwise a settlement must take place, and then an alteration in the distribution of the pressure would follow. It was, of course, interesting to test models, but he did not put much faith in testing models. Models proved stronger than the structure they represented for various reasons, one of which could be mentioned, viz., that the lineal dimensions varied directly as the scale, but the sectional area of the principals varied as the cube of the scale, so that one did not get the same proportion between the model and the real structure unless allowance was made for that point. The advantage of using Portland stone was very well put, and he thought this advantage was generally admitted, because it was sufficiently porous to get a good key with cement-mortar.

Mr. Chas. Reid said that the arches of plain concrete that had been described were highly developed by the German engineers, and were no doubt very economical all round in the matter of material, this material being adapted for very flat arches. He would like to know if the same conditions would apply to arches of stone. All the arches described might have been built of stone instead of concrete, and the action would be just the same. Looking at the designs of reinforced concrete arches, it seemed to him that the principle in their case was to combine the arch with the abutments. He had many designs in his mind where the iron and reinforcement were carried down to the abutments and piers, and there made one with the arch, so that it became a monolithic structure. He quite agreed that concrete as now made was of such a high quality that a much higher stress might be put upon it than was usually done. With regard to putting on a higher stress than 30 or 35 tons, it must be remembered, though this might be done with safety, in a large structure they were not at present quite certain that the whole of the material was exactly of the same character as one particular block. They were trying to obtain that absolute uniformity in the manufacture of concrete which was desirable, but he knew from experience that they might have some good concrete work done some days, and yet on other days, according to the weather or the condition of the man, it would not be so good. As to tests, he thought it was much more reliable to test blocks of 1 ft. cube than of 4 in., as was so often done. He had an interesting experience in testing some blocks or columns 10 in. square and 4 ft. long. Several were made with different kinds of reinforcement, and one or two without any reinforcement at all. They were tested at the School of Technology in Manchester, under Professor Popplewell. As far as he remembered the reinforced concrete broke from 230 tons up to 270 per square foot, and some 300, but the column without any reinforcement stood 316 tons. A good many suggestions were made as to why this should be, and it was said that the man who had made up the column had put better cement into the plain concrete than into the reinforced concrete, in order to try and make the reinforced concrete weaker. It was his impression that the result was obtained simply because the concrete was better rammed in the one case than in the other.

Mr. Herbert Brooks observed that the largest breaking test ever made was in connexion with the Düsseldorf Bridge, and it would be exceedingly interesting to know something more about it. When in Berlin he found that the members of the German Concrete Union were greatly interested in the proceedings of the Concrete Institute, and he was informed that they would be pleased to exchange opinions and tests in various branches of concrete with the members of the Institute.

Mr. Wells, in reply, said he thought they would find at the present day there were a great many retaining walls which were nothing but brickwork, the only thing in concrete being the foundations. He had experimented largely with Portland stone concrete, and he concluded that if excellent results were to be obtained it must be well soaked with water, then with sand and cement dry, the stone damped, and water added as required. It would then be possible to obtain an absolutely perfect concrete. With reference to the columns spoken about by Mr. Reid, he was sure that more cement than 5 to 1 was put in, and he was not at all surprised that the unreinforced concrete carried more than the reinforced.

The next meeting will be held on May 27.

## THE CARPENTERS' HALL LECTURES:

### DECORATIVE PLASTER WORK.

THE eleventh of the series of the lectures on Arts connected with Building, arranged by the Carpenters' Company, was delivered in Carpenters' Hall, London-wall, on Wednesday last week by Mr. Laurence A. Turner, whose subject was "Decorative Plaster Work." Mr. H. Phillips Fletcher, Surveyor to the Company, presided.

Mr. Turner, who showed a large number of lantern views in illustration of his remarks, and for the purpose of showing the historic growth of the craft in design and treatment, said there was a good deal of confusion of terms used in describing the various processes in plaster work, and he was glad to see that Mr. Bankart in his book on the "Art of the Plasterer," had put them clearly and concisely. "Stucco-duro" was carbonate of lime mixed with sand, for the first two or three coats, the last coat being mixed with marble dust. This was the material used by the Italians for modelled work done in situ. The lime was ordinary lime such as was used for making mortar. The "quicklime," as it was called when limestone had been burnt in the kiln, was mixed with water, which caused it to dissolve; it was then kept in a moist state for a long time—the longer the better. After being kept in this condition for many months, even for many years, it lost its caustic qualities and became what was technically known as "fat," and could be modelled almost as easily as clay. "Pargetry" was made of lime mixed with sand, or powdered tiles, and hair. "Plaster of Paris" was sulphate of lime, and was made from baked or boiled alabaster, which was then very finely ground, and which set hard in a few minutes when mixed with water. "Fibrous plaster" was a plaster of Paris, which was strengthened by inserting wood laths and coarse canvas.

The earliest form of plastering known to exist in England was that of the dauber in which wooden structures covered with wattles had a coating of clay squeezed between the wattles and smeared over the face to keep out the weather. This primitive method must have been in constant need of repair, for there were few materials that swell and shrank more than clay, according to the amount of water contained. Later on, clay and sticks were used as a filling between the wood framings of which the houses were built (very much in the same way as lath and plaster partitions used to be filled with dry seaweed), which again was covered on both sides with lime plaster mixed with sand, or broken and pounded tiles. This method of making the exterior walls of a house was thoroughly sound and good, as it was weather-proof, and, moreover, capable of resisting extremes of temperature. The man who did the clay work to the walls was called a "dauber," and there were men to this day who still called themselves daubers. Unfortunately for the dauber the County Councils' by-laws did not allow him to practise his craft as dauber, so he had to fall back entirely upon thatching for his means of livelihood. The only work he could get now as thatcher was in repairing existing thatched roofs or thatching haystacks, for the building by-laws again interfered with his craft, as it forbade the use of thatch where it had not been used before. A very artistic thatcher the thatcher was, too, making many different and pretty patterns in the thatch without effort, the result, no doubt, of the continuity of a craft handed down from father to son for many generations of thatchers.

Traces were to be found in Saxon churches of their having been plastered externally both from actual remnants as well as from illustrated manuscripts; and there were Norman churches in which they could still

see the way in which a simple form of decoration was used to finish off the thickness of the plastering on the soffits of the arches, as at Compton Church, near Guildford, and two other churches near by, *i.e.*, St. Mary's, Guildford, and Puttenham. For plain plastering, the next great advance was the addition of hair with the lime and sand, the outside work having modelled ornament sometimes added. This method was called "parge," or "pargetry," and had been in use ever since. The lime-plaster work often had chopped hay instead of hair mixed with it, and pebbles, if used for roughcast, as was now the method. Nearly all the ceilings up to the end of the XVIIth century were made of slaked lime mixed with sand, and were run or modelled in situ, the more elaborate parts of the ornament being cast in plaster of Paris and inserted or bedded on to the ceiling, or squeezed in lime plaster from moulds made of plaster or wood. By "squeezing," was meant that the mould after being filled with plaster, and allowed to get partly set, was pressed against the ceiling, after a little plaster of Paris had been added to the back and held in position until the plaster of Paris had set; the mould was then taken away, leaving the cast sticking to the ceiling.

It was not until we came to the time of the ambitious Cardinal Wolsey that the art of the plasterer brought itself into prominence, and this came about chiefly through his importation of Italian plasterers, who introduced new methods and a more refined type of ornament; as was to be seen in the room at Hampton Court, called Wolsey's Closet. It was sumptuous to the last degree. The enrichment was so lavishly used that it was the plain moulded ribs that became the point of interest to which the eye was attracted. That this ceiling was put up by Cardinal Wolsey was evident from the fact that his motto was painted on the plaster frieze, which was of the same design as the ceiling, and, as he died in 1530, we must place this some years earlier. This ceiling was not strictly plaster work, for the ribs were made of wood, the bosses at the intersection of the ribs were of cast-lead, the small leaves radiating from them being bent back to cover the angles, and according to Mr. Gotch, the panels were made of "papier mache," and, as he said in his book on "Early Renaissance Architecture," were screwed to the wood joists. He thought it would have been more correct to say nailed; they would not have used screws in those days. In the work of Henry the Eighth's reign, the ceiling panels were small compared with what came later, the tendency being for them to get larger and larger as time went on. The ornament was small and cramped when compared with subsequent work. The Italians worked in stucco-duro, and had quite a different standard and type of design, as a basis upon which they worked. The surrounding architecture in their own country was so very different from our Gothic buildings, that it was not fair to criticise their work which was exotic here. We must not forget that it was largely to them that our forefathers owed the stimulus to plaster decoration which now became as fashionable, and which produced a school of plaster work such as had its counterpart in no other country, Italy, perhaps, excepted, in the history of the world. He did not think we Englishmen quite sufficiently appreciated this. There was but little abroad to compare with our English plaster work, excepting in the very richest of buildings, and what there was, was of a very different type from our domestic plaster work. It was the domestic plaster decoration of which we should be so justly proud, which was still to be found scattered over the whole of the United Kingdom, but which was so often ruthlessly thrown into the rubbish cart, to make room for some modern piece of engineering. This old plaster work was a most interesting and precious legacy left to us by our forebears, which should be treasured and treated with the greatest respect and care. It was only after the English plasterer had digested what the Italian had fed him with that he produced such a wealth of work, so full of strength and individuality, and so varied and ingenious in design. But though the imported Italian workman gave stimulus to the craft, it must also be remembered that it was but the further development of a true native tradition. The English plasterers assimilated their neighbours' work, but when they designed their own, although they made full use of what they had seen, yet they produced something entirely fresh and new. Would that we could say as much of ourselves! Yet we were on the improve, he thought. There was more individuality to be seen now than there was in decorative plastering ten years ago. We were adapting modern methods to produce work that was not mere copying, but which had some individuality and thought, and a right feeling for the use of the material.

The lecturer then spoke of the plaster work of the Palace of Nonsuch, and he showed a number of views of ceilings, etc. Proceeding, he said in Elizabeth's reign we had a period of great activity in building, when such houses as Haddon, Loseley, 1562, Burley Hardwick, 1590-7, Bramshill, Crewe, Littlecote, Chatsworth, and very many others, both large and small, such as the Star and Garter Hotel at Yarmouth, all of which are still existing, and though often sadly mauled, and shorn of their beauty, they still had enough left of the plasterers' work to show how rich a harvest of plaster decoration was reaped, both in quantity and quality, during the long and peaceful summer of Queen Elizabeth's reign. During the reigns of James I. and Charles I., roughly a period of fifty years from Elizabeth's death, the work of the plasterer continued to flourish and abound. There was elaborate plaster decoration being done about this time at Knowle, Audley End, Broughton, and numberless other houses over the whole country. Knowle Long Gallery, 1605, was perhaps one of the best-known ceilings in the country; it was beautifully modelled, the enrichments being cast and inserted; but he thought the design did not stand in the first rank. The repetition of curved lines, which wriggled from end to end of the long gallery, was monotonous and restless; some straight lines were wanted to steady it. This method of inserting cast ornament was a poor one; you could never hide the joint, however carefully done, and they were visible in this ceiling. If part of the ceiling ornament was to be cast and applied, it should be obviously so, as at Sir Paul Pinder's house, or else disguised so that the jointing was quite invisible. Towards the end of Inigo Jones's life he introduced a new treatment, and the work became more architectural and on a larger scale. In the late work of Inigo Jones we found the ceiling rib broadened out and many additional members added to the mouldings, as well as a wreath, generally of fruit and flowers, applied to the flat soffit. The large coved cornice often became a strong feature, as well as the placing of a large recessed panel in the centre, forming the chief feature of the ceiling design. This Renaissance type of work soon spread itself over the country, but at the same time the older type of design was to be found being used at a very much later period; tradition died hard, and consequently it was difficult to date some work, unless it was actually known from records of when and how it was done. The Fire of London marked a further development in the designing of plaster ceilings. Wren introduced a freer treatment, but, at the same time, keeping it thoroughly architectural. There was much of his work to be seen in London. The New River Company's Board Room ceiling was a good specimen. It had been criticised as being too heavy for the size of the room. He (the lecturer) was much surprised when he measured it to find how strong the modelling was, viz., about 4½ in. on the spandrils, and yet how well the work kept its place. It was important that the work of the modeller be kept in place by architectural boundaries, as it was in the ceilings designed by Wren, but it was not so in all of Grinling Gibbons' work. Moreover, the modeller tried to emulate the work of the carver, and, consequently, from this date the quality of softness and ductability that should be the great charm of plaster work began to disappear. The work became more and more undercut and unsuitable to the material. With the multiplicity of mouldings and the exactitude of Renaissance architecture, there must, of necessity, be less free modelling on the plain surfaces and mouldings than was the case in earlier work, so that for effect it must depend wholly on design and strong contrast of light and shade, and not upon texture and delicate modelling, which was what he delighted to see in plaster decoration. James Gibb built the Senate House, Cambridge, 1772, and the Radcliffe Library, Oxford, in which the plaster work was getting rococco. The architectural quality disappeared, and quasi ornament composed of squirming curves which had been aped from French work, took the place of the dignified forms that were to be found in Wren's designs. The best of this type of ornamentation had something to be said for it when it was used with restraint, and it was well adapted to small rooms. The next period was that in which the brothers Adam were most productive, between the years 1760 and 1790. They did put a restraining hand upon the modeller, and they got a certain delicacy of effect by keeping the relief very low, and using a large amount of plain ground to the amount of ornament. But it was no longer worthy of the title "plaster work"; neither was it plaster, for most of it was "compo," the same material as was used for ornamentation of picture-frames, and which was produced by pressing a doughy substance made plastic by moisture and heat into wooden moulds under great pressure. The impressions were then placed in position whilst pliable. In truth it was a reproduction of wood carving. Geo. Richardson followed on much the same lines, and plaster work as an art was dead and buried.

As to present-day work, what was the cause of the craft falling to such a low level as it did during most of the XIXth century? Was it not because the man who modelled the ornament was not a plasterer, and that he was copying a style which for him had no tradition, and the plasterer was purely a mechanic whose sole object was to be as exact and mathematically correct as possible? The use of "fibrous plaster," which was invented about fifty years ago, was a method which necessitated all the work being cast; consequently it was the modeller who became solely responsible for the artistic properties of the work. Some work was better and cheaper modelled in situ, but in most cases this method was quite prohibitive in cost, in these days, when labour was so much more highly paid than in Wren's time. There was so much to be said about methods of production that it was quite hopeless to even touch upon this side of the subject, but he was very certain of this, that it was only to be learnt by the system of apprenticeship. It was very well to append evening classes to daily instruction given in the workshop, but it was not possible to become proficient at any craft in any school or college which existed only as a teaching centre. Without experience acquired on work carried on for actual use, no one would become worth his salt, however many diplomas and medals he might have won on work made for the purpose of teaching. Art was long, and we were always trying to hide the fact. In Charles II.'s reign a charter was granted which forbade any person to carry on the art of plasterer without having been apprenticed for seven years. Search days were annually appointed up to 1832, and fines inflicted for using bad materials and bad workmanship. This would include the

modeller in those days, as there would not be the distinction there was now. There was no fault to be found with the plasterer who worked in fibrous plaster, but for the man who worked in lime plaster there was a great deal to learn. He was the man who should be taught to model, and the modeller should be taught to plaster. Above all, it was the modeller who wanted stirring up. Get him o shake off his old ideas of copying old forms quite unsuited to the material. Get him to appreciate what the beauty of plaster modelling should be, and at once we had a living craft. There was ample scope for him. Surely we were not so lethargic that we could not think out new ways for treating designs for plaster decoration. It was quite possible to produce work which would have a character marking its date as distinctly as did that of our forefathers at the different periods of history. If they were asked to make a ribbed ceiling after some old pattern, by all means they should do it, but they should not make it look like cast-iron. He hoped and believed that we had got a young and healthy decorative plasterer growing up amongst us. Let them do their best to bring him up in the way he should go, so that he should soon be strong to labour, that there be no decay, no leading into captivity, and no complaining in our streets.

The Chairman said that he believed the British craftsman, when given the time and the opportunity, was the best in the world, but, in consequence of the stress of modern conditions, there were fewer opportunities than before. They owed a debt of gratitude to the Carpenters' Company for stepping into the breach and trying to neutralise to some extent the decadence of apprenticeship by the establishment of their craft schools and the founding of lectures by well-known craftsmen. The problem of such modern conditions must be faced, and we must all be up and doing our utmost to turn out good work, and to tackle the problems of to-day as they were presented to us, not in the leisurely manner of our ancestors, but in such a way as to conduce to the benefit and enjoyment of our clients. It was our duty to try and get them to appreciate the things that were inherently good and refined. Architecture had been described as ornamental building. This was contrary to the proper spirit of architecture, and, indeed, good architecture often consisted of buildings without any ornament at all. If the ornament did not arise in the course of the constructive efforts of the architect, but merely had an *appliqué* appearance, it must be an outrage to a cultivated mind, and the inappropriate ornamentation of many buildings of the present day was the cause of their being so unsatisfactory. He had just received a catalogue containing designs in iron which obviously had been executed by someone who knew absolutely nothing at all about iron, and the result was that the draughtsman had produced drawings which were entirely incongruous, and must show to any practical man blatant ignorance of the first properties of the metal. While it was impossible for architects to be absolute masters of every craft, they must at least understand the properties and the feeling of materials before they attempted to convey to craftsmen and manufacturers their ideas in design; and, indeed, they must try to be a mate of all trades and master of their own; or, in other words, to understand something about every craft, and everything about their own.

A hearty vote of thanks was accorded to the lecturer, and the proceedings terminated.

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COUNCIL SCHOOL, WOODBRIDGE, SUFFOLK.—New elementary schools, to accommodate boys, girls, and infants, have been built at Woodbridge, at a cost of 6,300*l*. The premises have been erected according to plans, etc., prepared by Mr. J. S. Corder, of Ipswich, Mr. J. S. Parmenter being the quantity surveyor, and Messrs. T. Parkington & Sons, contractors. The duties of clerk of works were carried out by Mr. W. Gobbitt.

## ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

A METROPOLITAN district meeting of the Association of Municipal and County Engineers was held at the Caxton Hall, Westminster, on Friday evening, March 26, Mr. E. P. Hooley, M.Inst.C.E., of Nottingham, President, was in the chair, and there were present Messrs. W. Nisbet Blair (St. Pancras), W. F. Loveday (Stoke Newington), T. Cole (Westminster), Secretary, H. A. Giles, Assistant Secretary, W. Fairley (Westminster), W. Weaver (London), F. Sumner (City of London), P. G. Killick (Finsbury), A. E. Prescott (Eastbourne), E. P. Newton (Paddington), O. E. Winter (Hampstead), T. W. A. Hayward (Battersea), A. J. Turnbull (Greenock), R. O. Wynne Roberts, C. H. Cooper (Wimbledon), and others.

### *Concrete.*

Mr. Wm. Challoner read a paper on "Concrete: Its Aggregate and Mixing."

He said it was proposed to deal with conditions inseparable from the actual work rather than the more academic side as demonstrated by the expert and chemists in the laboratory.

As its name implied, concrete, when in a finished condition, should be a perfectly homogeneous and fixed mass, and, whatever the proportions, its constituent aggregates should be equally distributed throughout the whole. It was, however, obvious that this condition could not be obtained if the constituents did not each in their own way lend themselves to secure this result.

Although the binding materials were essentially the principal ingredients, they were, nevertheless, largely dependent for their value upon an intimate association with other materials, as also upon the composition and form of these, and the chemical action of the binding materials might be assisted or retarded by these other ingredients, which invariably form the greatest proportion of the finished mass. In this connexion, it was by no means unusual to find engineers who, without further investigation, attributed any failure or degeneracy in concrete to the cement, when probably the cause was entirely due to injurious elements contained in the aggregates.

In a paper read recently before the members of an institute which had been lately formed ostensibly for the purpose of enlarging and connecting the knowledge associated with this important department of engineering, it was pointed out that there was no objection to foreign matter in the form of finely-divided clay occurring in the sand intended for use in making concrete, but the author of the paper made reservations as to this, by advising that tests be carried out before risking its use.

He submitted that though supported by exhaustive laboratory tests, it would be unsafe to give any contractors latitude in so important a matter.

Clay had frequently been used to secure the requisite density in the finished concrete when, owing to local circumstances, suitable sand could not be easily (or more probably cheaply) obtained; but the author ventured to state that there were other safer and much more certain methods of securing this condition, and with which greater ultimate permanency could be assured without the risk that must always be associated with the use of clay.

As the permanency of binding materials, especially Portland cement, was affected by the composition of the sand, this material merited very careful selection, and it would frequently be found that a little extra cost incurred in providing suitable sand would not only advantageously affect the stability of the work, but be repaid by a saving in the quantity of cement.

In like manner the specification of stone for making concrete, after limiting the size of the smallest and largest particles, which might vary in respect to the particular necessities of the work described that it should be hard and not capable of absorbing more than 6 per cent. of moisture, nor should disintegrate at a temperature between 1° and 200° Centigrade. It should be thoroughly washed free from dust, earth, or other foreign matter, and the period of this operation was limited to some suitable specified period before it was mixed in the concrete. To these restrictions were usually added others to secure the exclusion of stone or ballast which contained traces of sulphur or oxides of iron, or to prohibit the use of burnt chemical refuse, slag, or carbon materials which might contain these elements.

Although not of the same frequent necessity as stipulations regarding the other component parts of concrete, it was advisable to provide in the specification that the water should not contain impurities that would injuriously affect the hardening or ultimate permanency of the concrete.

Of these impurities peat, vegetable matter, and salt were perhaps the most common objections, although where hydraulic silicates were used (as was the common practice on the Continent) sea-water gives the very highest results in regard to strength and permanency.

There would appear to exist amongst engineers and contractors a somewhat lax conception of what constituted the correct volumic proportions of concrete, and that evidently arose from the questionable practices which were common in this country of measuring the aggregates (sand and stone) in combination, and computing the volumes from the dry, unmade materials instead of the finished concrete.

The common practice of describing concrete as 6 to 1 or 8 to 1 had probably crept in through the use of dredged ballast where the stone and sand was in combination, and was, in the author's opinion, worthy of more attention from engineers than was often devoted to it, in order that a strict definition of what was really meant might be arrived at.

In regard to the subject of density, it was always necessary that the mortar, *i.e.*, binding materials and sand, should be dense for whatever purpose it was required, but it was not always so necessary that the mortar should completely fill up the voids in the stone aggregates of concrete. This was especially the case when impermeability was not necessary.

Greater strength was secured by a strong mortar that did not completely fill the voids than with a weaker mortar that secured that result.

It was found that a mixture of one volume of cement, 3 volumes of sand, and 6·5 volumes of stone gave the same strength as one volume of cement, 3 volumes of sand, and 5 volumes of stone. Also:—

One volume of cement, 4 volumes of sand, 8 volumes of stone gives the same strength as one volume of cement, 4 volumes of sand, and 6 volumes of stone.

The proportion of water which would enter into chemical combination with concrete varied slightly in different mixtures and with different makes of cement, but it might be taken for practical purposes at 15 per cent. of the volumes of binding materials and sand.

This quantity was not, however, sufficient to allow for evaporation, absorption, and consolidation, but the excess required would be governed by temperature and other conditions of environment.

There could, however, be no room for a divergence of opinion in regard to sloppy or dry concrete, as an excess in either direction would defeat the necessary object of securing that there was a perfect distribution of all the component ingredients of the concrete throughout the mass when placed in its ultimate position.

The practice which commonly obtained of mixing all the concrete materials dry, either by hand or machine, had nothing to recommend it beyond that it was a little less troublesome, whilst it was opposed to reason

that the most perfect distribution of all the particles could be secured by that process.

It would appear more reasonable to secure a perfect mixture of the smaller particles as a first part of the process, and this might be obtained by mixing the binding materials, sand and water, in a mortar-pan and rollers, or a machine that would secure like results.

The superiority of machine-made mortar over the hand-made variety required no illustration beyond the common-sense knowledge—that a perfect and equal distribution of all the constituent particles must, of necessity, give better results than a less perfect intermingling.

The mortar thus obtained should then be mixed with the stone aggregate, the latter being wetted to cause the mortar to adhere by the prevention of undue absorption of water from the mortar on the otherwise dry surface of the stone.

The mixing of the mortar with the stone could be most efficiently accomplished in a rotary-mixer, this process being limited to the distribution of the mortar equally throughout the stone aggregates.

If it was inconvenient to use a rotary-mixer, and this part of the process was performed by hand, the same care should be exercised, and for this reason a long banker, on which the materials could be laid out two or three shovels wide, and turned over from both sides, would give much better results and effect a saving in labour which could not be obtained by the usual practice of dumping the material in a large circular heap and turning it over to another position, whilst the water thrown on with a bucket washed some of the cement to the bottom or through the open joints of the banker planks on to the ground beneath.

Mr. R. Brown (Southall), in moving a vote of thanks to the author, said the paper was an important one at this moment when the question was so much before the public, and especially engineers. There was no doubt that on the aggregate and the mixing depended the strength of the concrete.

Mr. W. Nisbet Blair (St. Pancras), who seconded, referred to the practice which was carried on at Liverpool some years ago. Instead of mixing the whole of the materials contained in the concrete, and turning it over several times, it was the practice of the Liverpool Corporation to mix the finer material, sand and cement, in the form of a mortar, and, having first spread a layer of broken stone, one stone thick, without any overlapping, the bed of broken stone was covered with a layer of this mortar, then came another layer of broken stone and another of mortar, until the whole thickness desired was laid in layers. It involved considerable economy in the saving of the turning of the material, and from examination of a road foundation formed in that way years afterwards there was no indication whatever of layers. It appeared when the section was cut as if the whole of the material had been turned over together in the ordinary way. There was another fact which resulted from the practice, corroborated by the paper, that they could get as good a concrete in proportions of 9 or 10 to 1 as by mixing the ordinary 6 to 1.

Professor H. Adams (London) said that in making a series of experiments it was not sufficient to have three and take the average, because one would not be lineable with the remainder. It was the elimination of irregularities that enabled them to get a regular curve to ascertain the true average results. They knew that clay had recently been recommended by some people in the concrete when it was not in excess. He was in this difficulty in regard to clay. It was always a question whether the small particles of clay would surround the particles of cement, or whether the cement would surround the clay. They could hardly suppose that clay would form an adhesive compound. He considered the grading of the material a most important matter.

Mr. Fairley (Westminster) gave the results of some tests of concrete with and without an admixture of clay. The briquettes on the seven days' test with clean sand and ballast gave an average of 580 lb.; with 2 per cent. of clay, 570 lb.; with 3 per cent. of clay, 540 lb.; and with 5 per cent. of clay, 550 lb. Then, taking the twenty-eight days, which was with a different sample of cement, the average of the clean water briquettes was 677 lb.; with 3 per cent. of clay, 646 lb.; with 5 per cent. of clay, 512 lb.

Mr. C. H. Cooper (Wimbledon) said, no matter what results they might get in the laboratory, they ought to be very careful in admitting any clay in cement.

Mr. Cockerell (Great Yarmouth) said his experience had been that clay in concrete was a mistake. There were, however, cases in which concrete made in that way was tougher. For instance, a paved road would be tougher than if made with a thoroughly clean concrete, but for other work it was not as strong as a concrete made with a clean aggregate.

The vote of thanks was passed.

Mr. Challoner, in reply, said the common-sense way in which Continental engineers had approached this concrete question left something for us to learn. Mr. Blair had spoken of a concrete of 9 or 10 to 1. If the voids were filled that might be as good as a concrete of 6 to 1 with larger voids. At one of the meetings of the Concrete Institute there was quite a controversy as to sloppy or dry concrete. If it was too sloppy or too dry it defeated its object.

### *Refuse Destructors.*

Mr. Wm. F. Loveday (Stoke Newington) in a paper on the design and working of a modern destructor, said the general trend of development and progress in destructor practice, more particularly during the past two years, had been on the following lines:—

(1) The amelioration of the conditions for the workman in the destructor-house.

(2) The introduction of details in construction which ensured fairly high temperatures and a normal ruling condition in the furnace proper.

More efficient means had been introduced for the ventilation of the destructor-house, and this was a step undoubtedly in the right direction.

In this direction also means had been introduced for facilitating the clinkering of the fires. This was by common consent the most laborious operation in the whole cycle in destructor working, and anything that could render easier the clinkering of the fires would be hailed by the fireman, at any rate, with the utmost satisfaction.

Although there were several different firms who specialised in destructors, yet there were practically only two groups or types—namely, the "single cell" and "continuous grate." These might be again subdivided or classified by the method adopted in feeding the refuse into the furnace, namely:—

(1) Top feed. In which the refuse is fed in through the top directly on to the fire or on to a drying or desiccating hearth, and then pulled forward on to the firebars.

(2) Back feed. In which the refuse is fed in through an opening at the back and clinkered from the front.

(3) Front feed. In which the refuse is fed in through the front and clinkered from the same opening.

With regard to the top feed, although possibly there was considerably less handling, yet there were grave objections so far as obtaining good results from the combustion and evaporisation point of view. The front or back feed enabled the stoker to apply the refuse more evenly and with more discretion, and although the method of charging with the shovel by hand had been described as putting it on by the spoonful, yet to obtain the highest efficiency the makers of mechanical stokers had been employing this method of small quantities at a time with the best results.

In the single-cell type of destructor the cell was an isolated furnace, having an opening through which the refuse was delivered on to the grate bars, and an opening at either the back or front for the outlet of the products of combustion. These latter passed into a main flue, which was common to a number of cells built in parallel.

The continuous grate was, as its name implied, a number of grates in line, each having a separate ashpit, but with the space above the firebars communicating; that was to say, the gases passed the whole length of the series of grates into a combustion chamber, and from thence to the boiler. There could be no doubt that the continuous-grate type of furnace construction was being looked upon with much greater favour. The rate of burning in a continuous grate was higher than in an isolated cell.

As the result of careful observation, the author had found that the ratio of burning on each grate on a three-grate unit was as 3, 4, and 5. On the grate furthest from the combustion chamber the rate of burning was 55·21 lb. per square foot of grate area per hour; on the middle grate, 74·6 lb.; and on the grate next the combustion chamber, 89·6 lb.; which gives an average of 73 lb. per square foot of grate area per hour over the whole area.

Generally speaking, the following were features which should be absolutely insisted upon in any destructor installation:—

(1) Cleanly operation, absolute freedom from nuisance to the neighbourhood, and maximum comfort for workmen.

(2) Minimum capital cost, consideration being given to the value of the steam and clinker, and general efficiency.

(3) Low maintenance charges combined with low labour cost.

(4) The necessity for heating the air-supply has been more than ever demonstrated in recent years, and this can be most economically effected by placing the heater in the path of the waste gases just at the boiler outlet.

(5) Maximum evaporation.

(6) Regular steaming.

(7) Clinker of marketable quality.

The plant at Stoke Newington was erected by Messrs. Heenan & Froude, Ltd., of Manchester, and consisted of two units of three grates each; each grate had an area of 25 sq. ft., and there was a separate ashpit to each grate. At the end of each unit was a large combustion chamber at right angles to the furnace; at right angles to this chamber and parallel with the furnaces were placed two Babcock & Wilcox water-tube boilers, each with a heating surface of 1,741 sq. ft.

The average quantity of refuse received at the destructor in the summer was 30 tons per day, and in the winter 45 tons per day.

During the two years the plant had been in operation there had not been a sufficient use for the steam generated, and he was therefore unable to give a complete year's working of the results which could be obtained.

At present, beyond the small amount of steam required for the fan and the pump, there was a crusher engine of 15 horse-power, a disinfecting station, a small electric generating station, with a dynamo of 77 kilowatts capacity, which was worked nightly at a load of 170 ampères and 515 volts; and twenty-two public slipper baths. The boilers were set to blow off at 160 lb., and with the bye-pass damper partly open steam was constantly blowing off. During the winter six months, between the hours of 10 a.m. and 2 a.m., 2¼ lb. of water were evaporated per pound of refuse, and in the summer about 1½ lb. per pound of refuse.

The clinker was used for a large variety of purposes. During the last nine months the author had used some 1,000 tons, which had resulted in a saving of 330*l.* for ballast and sand.

Mr. R. A. MacBriar (Lincoln) moved a

vote of thanks to the author of the paper, remarking that, as Lincoln was considering the provision of a destructor, he would have liked to be told the best kind.

Mr. R. Brown (Southall), who seconded, suggested that engineers should agree to some recognised records brought to a comparative basis, with the combustible material reduced to its carbon equivalent.

Mr. T. W. A. Hayward (Battersea) said he had come to the conclusion that the continuous grate type of furnace was the best.

Mr. Wynn Roberts (Westminster) thought that hand or mechanical feeding of the furnaces at the ground level was better than a hopper at the top. In the case of a destructor with top feed the refuse was poured in, steaming took place, and they had smells in the building.

Mr. Fairley (Westminster) contended that the efficiency of a destructor plant for raising steam depended upon the flues. They must be designed in such a form that they could be easily rough cleaned without taking the destructor off.

Mr. W. Nisbet Blair (St. Pancras) said the speed upon which they could dispose of refuse depended largely upon the draught pressure. They might have sufficient draught under their grates to effect the burning as quickly as they desired, but they must have a sufficient chimney suction to remove the products.

The President expressed an opinion that manufacturers of destructors should adapt them to the use of small towns and villages.

The vote of thanks having been passed,

Mr. Loveday replied to the various questions which had been raised in the discussion.

## THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, Sir M. Beach-croft, Chairman, presiding.

*Loan.*—It was agreed to lend Stepney Borough Council 10,000*l.* for electric lighting.

*The Works Department.*—The adjourned Works Committee's report, submitting statements of works completed during the half-year ended September 30, 1908, some particulars from which we gave in our issue for March 20, page 345, was adopted.

Mr. White said that when they buried a thing they did not usually say anything unkind, and so he would like to pay a tribute to the excellence of the service rendered by the officers of the late department. The manager had done his utmost under great difficulties to carry out the wishes of the Committee, and he had acted most loyally. But on behalf of the ratepayers, he thought they had, in abandoning the department, adopted the right course.

Mr. Smith (Deputy Chairman) remarked that Mr. White had proved an efficient Lord High Executioner.

*Street Improvements.*—It was agreed:—

That the supplemental estimate of expenditure on capital account of 5,000*l.*, submitted by the Finance Committee in respect of the widening of Mitcham-road, be approved.

That the supplemental estimate of expenditure on capital account of 375*l.*, submitted by the Finance Committee in respect of the widening of South Lambeth-road at Clapham-road, be approved.

That the estimate of expenditure on capital account of 6,500*l.*, submitted by the Finance Committee in respect of a widening at the junction of Wandsworth-road, Lavender-hill, and Cedars-road, in accordance with the plan, be approved.

That payment of 1,600*l.* to the Shoreditch Metropolitan Borough Council on account of the Council's promised contribution towards the cost of widening Old-street, at Nos. 316 to 322, be sanctioned.

*School Works.*—It was agreed:—

That the estimate of expenditure on capital account of 980*l.*, and the estimate of expenditure on maintenance account of 440*l.* for the financial year 1909-10, under standing order No. 359, submitted by the Finance Committee, in respect of the erection of two additional staircases at the Farrance-street school (Limehouse), be approved.

That the estimate of expenditure on capital account of 510*l.*, submitted by the Finance Committee in respect of the provisions of an additional staircase at the Teesdale-street school (Bethnal Green, N.E.), be approved.

*Arbitration as to Paving.*—The Highways Committee reported as follows:—

"The Council, on January 26, 1909, decided to apply to the Board of Trade, under the provisions of the London County Tramways (Electrical Power) Act, 1900, to appoint an arbitrator to determine the questions which had arisen between the Council and the Bethnal Green and Hackney Metropolitan Borough Councils with regard to the paving materials to be used in connexion with the reconstruction of the tramways from Hackney-road, *viâ* Mare-street and Lower and Upper Clapton roads, to Stamford Hill. The Board of Trade appointed Mr. R. O. Wynne-Roberts, M.Inst.C.E., to act as arbitrator, and the arbitration was held on March 15, 16, and 17, 1909. The arbitrator, with a representative of each party, also viewed the tramways in question on March 18. The arbitrator has now issued his award. The effect of the award is to require wood paving to be laid in certain portions of the tramways area and granite paving in other portions. The award further provides that each party shall bear its own costs of the reference, and that the Council shall bear half (35*l.*) the cost of the award, the remainder being borne equally between the two Borough Councils concerned."

*Tramway Works.*—The following recommendations were agreed to:—

That the supplemental estimate of expenditure on capital account of 1,230*l.*, submitted by the Finance Committee in respect of the provision and laying of a conduit crossover, including a short length of single line of tramways at the southern end of Archway-road, to be used in connexion with the working of the Council's tramways in Junction-road, be approved.

That the estimate of expenditure on capital account of 4,500*l.*, submitted by the Finance Committee in respect of the construction of a new embankment wall at the river frontage of the tramways permanent way depôt in Greenwich-road, Deptford, be approved.

Having transacted other business, the Council adjourned.

## APPLICATIONS UNDER THE LONDON BUILDING ACTS, 1894 to 1908.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Acts, 1894 to 1908. The names of applicants are given between parentheses:—

*Lines of Frontage and Projections.*

*Hampstead.*—Porches to two houses on the south-eastern side of Barby-avenue, Hampstead (Mr. C. H. Saunders for Mr. J. Wilson).—Consent.

*Kensington, South.*—The retention of a show-case in front of No. 18, Beauchamp-place, Brompton-road, Kensington (Messrs. Pauline & Co.).—Consent.

*Kensington, South.*—That the application of Messrs. Chinnock, Clark, & Chinnock, for an extension of the periods within which the erection of buildings on the site of Nos. 39, 41, 43, 45, and 47, High-street, Kensington, was required to be commenced and completed, be granted.—Consent.

*Marylebone, East.*—Three one-story bay windows, and a one-story porch, to the house known as "Longwood," abutting upon the north-eastern side of Avenue-road and the north-western side of Albert-road, St. John's Wood (Mr. A. F. Faulkner for Mr. W. Willett).—Consent.

*Marylebone, East.*—A porch and bay window in front of "Fairfax House," Avenue-road, St. John's Wood, St. Marylebone (Mr. A. F. Faulkner for Mr. W. Willett).—Consent.

*St. George, Hanover-square.*—The retention of an iron and glass shelter in front of the porch of the Coburg Hotel, Carlos-place, Grosvenor-square (Mr. E. H. Watts).—Consent.

*Width of Way.*

*Whitechapel.*—Retention of No. 38, Spital-square, Whitechapel (Messrs. Tasker & Wright for Mr. G. A. Dowse).—Consent.

*Width of Way, Lines of Frontage, and Projections.*

*Camberwell, North.*†—Buildings on the north-eastern side of Southampton-street, Camberwell, to abut also upon the northern side of Cottage-green (Messrs. H. King & Son for Mr. F. Flower).—Consent.

*Marylebone, West.*—Enclosures to the porch in front of No. 10, Granville-place, St. Marylebone (Messrs. Green & Abbott for the Hon. A. Yorke).—Refused.

*Strand.*—Two four-story oriel windows and a porch at the East India United Service Club, to abut upon Duke-street, St. James's-square (Mr. W. Wallace for the East India United Service Club).—Refused.

*Lines of Frontage and Construction.*

*Hammersmith.*—Retention of a building at the rear of a stable on the western side of No. 93, Goldhawk-road, Hammersmith, abutting upon the eastern side of The Grove (Mr. W. B. Eyre).—Consent.

*Marylebone, East.*—The retention of a wood and glass bookstall, of a temporary character, at the Marlborough-road Railway Station, abutting upon Finchley-road and Queen's-road, St. Marylebone (Messrs. D. Cubitt Nichols, Sons, & Chuter for Messrs. W. H. Smith & Son).—Consent.

*Hampstead.*—The retention of a wooden bookstall at the Finchley-road Railway Station, and abutting upon Canfield-gardens, Hampstead (Messrs. D. Cubitt Nichols, Sons, & Chuter for Messrs. W. H. Smith & Son).—Refused.

*St. Pancras, South.*—The retention of a wooden bookstall at Gower-street Railway Station, abutting upon George-street and Euston-road, St. Pancras (Messrs. D. Cubitt Nichols, Sons, & Chuter for Messrs. W. H. Smith & Son).—Refused.

*Space at Rear.*

*Greenwich.*—A modification of the provisons of sect. 41, with regard to open spaces about buildings, so far as relates to the proposed erection of an addition at the rear of No. 56, Trafalgar-road, Greenwich (Captain W. Warburton, R.E., for the Greenwich Hospital Estate).—Consent.

*Mile End.*—A modification of the provisions of sect. 41, with regard to open spaces about buildings, so far as relates to the proposed erection of a cottage building in the gentlemen's airing-ground of the Bethnal House Asylum, Cornwall-road, Mile End (Messrs. Cheston & Perkin for the Trustees of the Bethnal House Asylum).—Consent.

*Width of Way and Space at Rear.*

*Kennington.*†—A building on the eastern side of Gasholder-place, Upper Kennington-lane, Kennington (Messrs. J. A. J. Woodward & Sons for Mr. H. P. Mundy).—Consent.

*Space at Rear and Construction.*

*Westminster.*—A deviation from the plans approved for the erection of a two-story shop upon the space at the rear of a building on the eastern side of Knightsbridge-green, Kensington, abutting also upon the northern side of Brompton-road, so far as relates to the erection of an enclosed iron and glass staircase to connect the said building with Park-mansions (Mr. T. H. Watson for Knightsbridge and Bradford Estate Company, Ltd.).—Consent.

*Formation of Streets.*

*Lewisham.*—Application of Mr. A. R. Westworth, on behalf of Mr. A. Cooper, for a further extension of the time within which the roadway of a new street for carriage traffic to lead from Perry-hill to Castlands-road, Lewisham, was required to be clearly defined throughout and thrown open to the public as a highway.—Refused.

*Working-class Dwellings.*

*Stepney.*—A deviation from the plans approved for the erection of blocks of working-class dwellings upon a site on the southern side of Adelina-grove, Mile End, so far as relates to an alteration in the position of the back addition of block E (Mr. A. M. Calnan).—Consent.

*Cubical Extent.*

*Chelsea.*—The conversion of stable premises on the north-eastern side of Lacland-place, Chelsea, into a motor garage, whereby such premises as converted will exceed in extent 250,000 cubic ft. (Mr. E. Flint for the London Improved Cab Company).—Consent.

*City of London.*—A further deviation from the plans approved for alterations at the premises of Edward Lloyd, Ltd., Salisbury-square, White Lion-court, Crown-court, and Hanging Sword-alley, Fleet-street, City, so far as relates to the erection of an iron building on the roof of the said premises (Edward Lloyd, Ltd.).—Consent.

*Uniting Buildings.*

*City of London.*—The uniting of No. 3, Gracechurch-street and No. 53, Cornhill, City, by an opening at the first-floor level (Mr. G. H. Hunt for the Direction der Disconto Gesellschaft).—Consent.

*St. George, Hanover-square.*—The uniting of Nos. 447 and 449, Oxford-street, St. George, Hanover-square, by an opening at the first-floor level (Mr. E. C. Beaumont).—Consent.

*Strand.*—The uniting of Nos. 3 and 4, Cockspur-street, Strand, by an opening at the first-floor level (Messrs. G. Head & Co.).—Consent.

*Space at Rear.*

*Marylebone, West.*—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as relates to the proposed erection of a scullery addition on the

space at the rear of the Marble Arch Hotel, on the northern side of Oxford-street, St. Marylebone, abutting also upon the western side of Old Quebec-street (Mr. Delissa Joseph for Mr. F. J. Coxhead).—Consent.

*The recommendations marked † are contrary to the views of the local authorities concerned.*

# Competition News.

GUARDIANS' OFFICES, PONEARDAWE.

In a competition recently held for these offices, the design of Mr. Arthur U. Leon, 20, Working-street, Cardiff, has been selected, to whom a premium of 10*l.* 10s. has been awarded.

CHAPEL, PENCLAWDD.

The Bethel Independent Church, Penclawdd, recently invited designs for the erection of a new chapel to contain 800 seatings; the approximate cost, including heating and acetylene lighting apparatus, was to be 3,000*l.* The design of Mr. William Beddoe Rees, of 3, Dumfries-place, Cardiff, has been selected, to whom the premium of 5*l.* 5s. offered has been awarded.

## BOOKS RECEIVED.

CATALOGUE OF WORKS OF ARCHITECTURE IN THE PRINCIPAL LIBRARIES OF MANCHESTER AND SALFORD. (Manchester; University Press. London; B. T. Batsford. 3s. 6d.)

THE CHEMISTRY AND PHYSICS OF BUILDING MATERIALS. By Alan E. Munby. (Archibald Constable & Co. 6s.)

MARBLE AND MARBLE WORKING. By W. G. Renwick. (Crosby Lockwood & Son. 15s.)

BARONIAL AND ECCLESIASTICAL ANTIQUITIES OF SCOTLAND. By R. W. Billings. Part XI. (Edinburgh; T. N. Foulis. 1s.)

LITTLEHAMPTON, ARUNDEL, AND AMBERLEY. By W. Goodliffe, M.A. (The Homeland Association. 6d.)

ILLUMINATING AND MISSAL PAINTING ON PAPER AND VELLUM. By Philip Whithard. (Crosby Lockwood & Son.)

## PROJECTED NEW BUILDINGS IN THE PROVINCES.

ABERGALE.—Shelters on the promenade, and two conveniences. Mr. W. R. Jones, Surveyor, Council Offices, Abergale.

Aylesbury.—Stables and stores for the Corporation. Mr. W. H. Taylor, Aylesbury.

Arlecdon and Frizington.—Proposed gasworks (6,000*l.*). Mr. J. Ashbridge, Surveyor to Urban District Council, Arlecdon and Frizington.

Atherstone.—Pumping-station and reservoir. Mr. H. J. Coleby, surveyor, Atherstone.

Brentford.—Additions and alterations to Town Hall. Mr. Nowell Parr, Surveyor, Brentford Town Council.

Bilston.—Stores and additions to depôt, etc. Mr. V. Turner, surveyor, Bilston.

Barnstaple.—Refuse destructor. Mr. E. Saunders, Market-place, Barnstaple.

Bangor.—Technical school and library. Mr. E. Wood, architect, Bangor; Messrs. Dowling & Sons, builders, Cromwell-road, Belfast.

Bridgend.—Offices for the Guardians. Mr. P. Thomas, Bridgend.

Bristol.—Locomotive sheds.—Engineer, Great Western Railway, Paddington.

Buxton.—Enlarging mineral baths. Mr. W. H. Grieves, Buxton.

Burnley.—Skating-rink, Church-street, Mr. S. Taylor, Manchester-road, Burnley; extension to ice factory, Mr. J. H. Pickles, architect, Burnley.

Belstone.—Church hall. Mr. E. Crocker, Queen-street, Exeter.

Birkenhead.—Swimming-baths (1,800*l.*). Mr. C. Brownridge, Borough Engineer, Town Hall, Birkenhead.

Bognor.—Pavilion (1,000 places). Mr. E. A. Bridges, Bognor.

Brentwood and Billericay.—Sewerage disposal and pumping-station. Messrs. Willcox & Raikes, 63, Temple-row, Birmingham.

Bridlington.—Workmen's cottages, Mr. E. R. Matthews, Surveyor to Bridlington Town Council; additions to Fort Hall, Mr. E. R. Matthews, Surveyor to Bridlington Town Council.

Burton-on-Trent. — Police-station (13,000*l.*). Mr. J. T. Lynam, architect, Burton-on-Trent.

Carshalton.—Four houses, Hawthorne-road and Farriew-road. Messrs. Windebank & Co., Hillcrombe-road, Sutton.

Cheltenham. — Extensions to Corporation depôt sheds. Mr. J. S. Pickering, architect, Cheltenham.

Caversham.—Two blocks, isolation hospital, Mr. A. J. Smith, Caversham; proposed fire-station, Mr. A. J. Smith, Caversham.

Darlington.—Higher-grade school (5,800*l.*). Mr. M. Winton, Town Hall, Darlington.

Eltham.—Four houses, Glenhouse-road. Mr. A. C. Corbett, care of J. J. Basset, 121, Earlshall-road, Eltham.

Egremont.—Wesleyan church. Mr. S. Ellison, architect, 22, Sir Thomas-street, Liverpool.

Eastbourne.—Skating-rink on pier. Manager, Eastbourne Pier Company, Eastbourne.

Eastwood.—School (8,000*l.*). Mr. E. Hooley, Shire Hall, Nottingham.

Falmouth.—High school for girls. Mr. S. Hill, architect, Redruth.

Fazakerley.—Parish hall. Mr. F. Rimington, architect, North John-street, Liverpool; Messrs. E. Woods & Co., Bootle.

Hordon.—School (3,000*l.*). Mr. F. Coates, Durham.

Holsworthy.—Chapel (2,500*l.*). Mr. T. Parsons, Holsworthy.

Ilford.—The Urban District Council have approved the following plans:—Four houses, Mortlake-road, Mr. P. Cornish; five houses, Auckland-road, Mr. H. Hollins; four houses, Kinfauns-road, Mr. E. Dunn; lock-up shops, Station Bridge, Mr. J. Wilson.

Liverpool.—Warehouse (12,000*l.*). Messrs. Walker & Strong, architects, Dale-street, Liverpool; Mr. G. Readdie, builder, Cambridge-street, Liverpool.

Llanfair.—School (2,800*l.*). Mr. J. Owen, architect, Menai Bridge.

Langley Park.—School (3,200*l.*). Mr. T. Rushworth, Shire Hall, Durham; Messrs. E. Rutter & Son, builders, Esh, Durham.

Moorley Edge.—School (2,500*l.*). Mr. T. Rushworth, architect, Durham; Messrs. Cleary & Charlton, builders, Sunderland.

Merton.—Extension of depôt (500*l.*).—Surveyor to Merton Urban District Council.

Nuneaton.—Proposed abattoirs. Mr. F. Cook, Nuneaton.

Prestwick.—Offices and stores at Corporation depôt. Mr. S. Morgan, Prestwick.

Pollockshields.—Church (9,000*l.*). Messrs. Stewart & Patterson, architects, Blythswood-street, Glasgow.

Paisley, N.B.—Additions to county buildings (7,000*l.*). Mr. J. Murray, County Hall, Paisley, N.B.

Southampton.—The Town Council have passed the following plans:—Mr. J. W. Phillips, four houses, Cambridge-street; Mr. F. W. Young, three houses, Kenilworth-road; Mr. J. V. Blake, twenty houses, Hanley-road and Wilton-road.

Stockton-on-Tees.—Catholic school (3,000*l.*). Mr. A. Harrison, Stockton-on-Tees.

Salford.—Church. Mr. T. H. Cunliffe, architect, 2, John Dalton-street, Manchester.

Stratford-on-Avon.—Gas offices, Birmingham-road. Mr. R. Dixon, architect, Stratford-on-Avon.

Southend-on-Sea. — Lecture hall. Messrs. Burles & Harris, architects, Southend-on-Sea.

Stewardstown.—Church. Messrs. Young & MacKenzie, architects, Belfast; Messrs. W. Dowling & Sons, builders, Cromwell-street, Belfast.

Smallthorne. — School, Leek-road. Mr. Hutchings, architect, County Hall, Stafford.

Trimdon.—Co-operative premises. Mr. J. Hayes, architect, Wingate, Durham.

Whitechurch.—Proposed new school, Salisbury-road. Mr. E. C. Peele, Secretary, Shropshire Education Committee, Shrewsbury.

## METROPOLITAN WATER BOARD.

AT the fortnightly sitting of the Metropolitan Water Board on Friday last week, the following matters were dealt with.

*Blackfriars Bridge.*—An estimate of 6,860*l.* was approved for laying two 15-in. mains over Blackfriars Bridge so as to effect a connexion of the mains of the New River District with those of the Southern District.

*Storage of Water.*—The Water Examination Committee reported that the Director of Water Examination on Research Work had submitted his third report, dealing with the subject of the storage of New River water antecedent to filtration. The question of storage from the general point of view is dealt with. The outstanding conclusions were that storage reduced the number of bacteria of all sorts, if sufficiently prolonged; devitalises the microbes of water-borne disease; reduces the amount of suspended matter; reduces the amount of oxygen absorbed from permanganate; tends to lengthen the life of the filters, and renders a breakdown in the filtering arrangements much less serious than would otherwise be the case. As regarded the number of days that a water should be stored before filtration, the Committee thought that the storage necessary for the purposes of quantity would probably be found sufficient for purposes of reasonable safety as regards quality of water under ordinary conditions. In their opinion the results of these investigations clearly proved that the policy of storing all raw river water antecedent to filtration was sound, and they felt that the habitual use of stored water lightened the grave responsibilities of the Water Board as regarded the safety of the London water supply, and tended to create a sense of security amongst those who watched over the health of the metropolis. The desirability of considering whether supplementary processes of water purification, such as mechanical filters, precipitation tanks, etc., should not be employed to tide over emergencies, was, however, a matter which merited attention in the future. They regarded these researches as not only of high scientific importance, but also of great practical utility, having, in their opinion, a direct bearing on the questions of London's future water supply.

*Observatory at Hampstead Heath.*—It was decided to grant the application of the Hampstead Scientific Society to establish on the surface of the Board's reservoir on Hampstead Heath a meteorological station and small astronomical observatory, subject to certain conditions. The observatory house will be about 12 ft. high and 11 ft. in diameter.

# Master Builders' Associations, etc.

BRISTOL MASTER BUILDERS.

On Tuesday evening, at the Royal Hotel, College Green, the annual banquet of the Bristol Master Builders' Association was held, and about one hundred were present. Mr. Frank N. Cowlin (President of the Association) was in the chair. Among those present were:—Mr. E. J. Brown (President National Federation), Alderman H. W. Twiggs (Chairman Bristol Docks Committee), Mr. Mowbray A. Green (President Bristol Society of Architects), Col. T. J. Scoones, Messrs. John Curle (Secretary Bristol Trades Council), W. H. Brown (solicitor to the Association), F. Chown (Vice-President), and A. J. Pit (Secretary).

After dinner the loyal toasts were given and heartily honoured.

Mr. Charles Long (Bath) proposed "The City and Port of Bristol." In replying, Alderman H. W. Twiggs said they had in Bristol to deplore the depression of the building industry; but they had done something in the Council to help the builders. They had spent much in the last seven years in construction, and contributed a great deal to the success of their own undertaking. He was delighted to find that the members of the building trade were not only content with constructive work in Bristol, but had gone across the seas, and their President was carrying out a contract in Jamaica.

Councillor G. H. Oatley also responded to the toast.

Mr. G. H. Perrin submitted "The National Federation of Building Trade Employers of Great Britain and Ireland." He said the Federation, in this, its thirty-second year, had attained large proportions, and was certainly one of the great and useful institutions of our country. There were weighty responsibilities resting upon the shoulders of their executive and council, for it must not be forgotten that their trade was a most important one—employing, perhaps, more labour than any other industry in the land. He gathered that the Federation was subdivided into no fewer than thirteen sections, of which the South-Western Centre embraced Bristol, Cardiff, Newport, Hereford, Stroud, Pontypridd, Exeter, etc. He noticed in the list of the Hon. Vice-Presidents honoured names in the trade, several of whom had in past years been their guests. Their organisation he looked upon as excellent, and practically perfect so far as it went; but there was room for expansion. The leaders of their Federation had performed arduous tasks for years past, and the funds reflected the wisdom of their administrators, for a balance of 4,200*l.* in hand was a good backbone to their Institution. In glancing over their annual report, he was struck with the multiplicity of subjects that had engaged the attention of the Council of the Federation. Their union was one of strength, and of inestimable value in his judgment, not only to themselves as master builders, but for the benefit of the vast number of *employés* engaged in the trade. It was apparent to anyone that without such an organisation as theirs many wild schemes would be thrust upon individual members of the trade or districts that would

materially damage both masters and men, but with such knowledge as they possessed in the Federation they were able to repel such attacks. It was distressing to learn that there were not apprentices being made for future requirements of many of the sections in their business, masons, bricklayers, slaters, tilers, plasterers, and painters. He was glad to note carpenters and joiners were not included, but the wood was wanted after the bricks and mortar. What were the youths of to-day doing? He feared they knew too well that they were sportsmen first, and not workers and patriots as they ought to be.

Mr. E. J. Brown responded. He said that the Federation commended itself to all of them who were units of it, and it behoved them to make it a power in the land. He regretted that there were parts of the country which were in a terribly neglected condition. There were no Master Builders' Associations, and it was a shame that there were not these bodies. As to London, there were very large builders who came to London and took advantage of the organisation they had there and never contributed to the trade organisation. As to the associations in the country, if all of them were like the Bristol Association they would be an important power in the land. They seemed to have an autonomy which worked well. They had a happy family, which permitted them to get along with their *employés*, and if they had trouble they got round the corner and squared the men in ten minutes. In London they had conciliation boards, and they were very fairly conducted, and sometimes they had to give a decision against themselves. Then they had to discuss piecework, and they said they should have a free hand in respect to it if they wanted, though the men had a rule against piecework.

Councillor A. Dowling submitted "Architects, Engineers, and Surveyors." He regretted that architecture was not more studied by the young, as they had fine examples around them. As to their trade, he believed now the shadow was behind them, and there were indications that they had seen the worse, and that their trade would show a revival.

Mr. Mowbray Green and Councillor Frank W. Wills acknowledged the toast.

Mr. R. F. Ridd gave "Kindred Associations and Visitors," to which Alderman J. Curle and Mr. H. Alsop responded.

Mr. W. H. Brown gave "The Bristol Master Builders' Association." He said that he congratulated the Association on having such an excellent President as Mr. Frank Cowlin.

The President, in responding, said they got on better than ever with the architects. There was room for the profession of quantity surveyor, and when he took off the quantities and supplied the accounts there was no room for fighting. As to the *employés*, they had satisfactory rules for the working men, which were a model.

### SHEFFIELD MASTER BUILDERS' ASSOCIATION.

The annual dinner of the Sheffield Master Builders' Association was held on the 17th ult. at the Building Trades' Exchange, Cross Burgess-street. Mr. W. W. Mears, President, was in the chair, and amongst those present were Mr. W. R. Thompson (Dewsbury, President of the Yorkshire Federation of Building Trades' Employers), Sir John Bingham, Alderman T. Nixon, Councillors W. C. Fenton, A. Cattell, England, J. Dawson, Mr. F. E. P. Edwards (City Architect), and Mr. Thomas Smith (Secretary).

The loyal toast having been honoured at the call of the President, Mr. A. W. Sinclair (Scarborough), proposed "The National and Yorkshire Federation of Building Trades' Employers." He congratulated the President upon his promotion. It might be said that there were conciliation boards, but he pointed out that those boards would not have existed had it not been for the Federations.

Mr. W. R. Thompson, responding, said he looked upon the Sheffield Association as one of the premier associations in the country. Touching upon the question of the Fair Wages Clause, brought forward in the House of Commons, he said that many years ago the Yorkshire Federation had some very serious disputes with trades unionism, and, although the Federation then won, the trades unions had fought most strenuously, in and out of Parliament, to obtain the ends they were then aiming at. If the motion had been carried in the House of Commons, they would have been under the heel of trades unionism very much more than in the past. Another matter being brought before the House of Commons which affected builders very much, and which had been considered many times, was a proposal to invest the Home Secretary with power to make certain rules and regulations applicable to the engineering and building trades, some of which were unnecessary. Representations had been made against some of them, but it was evident from the Bill which had been brought in that no amendment had been made in accordance with their suggestions. It was therefore necessary that they should try to impress, not only the Home Secretary, but members of Parliament with the necessity of some alterations being made in the proposed rules.

Responding to "The City and Trade of Sheffield," proposed by Councillor England (Barnsley), Sir John Bingham said it was his belief that architects and builders should work together, and he felt that contract work was far and away better and more to the interest of the workmen than municipal labour.

Councillor A. Cattell, who also responded, said he had a shrewd idea that he had been called upon because he had been for some time chairman of the Housing Committee of the Corporation. He had always recognised the active and pleasant co-operation with the builders of Sheffield in the great work the Committee had set itself to achieve, so far as the housing of the working classes was concerned. The builders themselves would be the last to deny that they owed a great deal to the architects and surveyors, who, while they were a guiding hand to the builders, were not a sufficient guide in themselves. Turning to the Corporation's part in building operations, he said the results were not happy. It was one of the greatest crimes a Corporation could commit to use the ratepayers' money against the ratepayers, and he would never subscribe to that doctrine.

Mr. A. J. Forsdike gave "The Architects and Surveyors." He said that never in his time had there been so much work done for so little money as at the present time. With a little assistance from the architects he thought they could get very much better conditions.

Councillor W. C. Fenton, responding, referred to recent remarks with reference to investments, and expressed the opinion that not only architects but builders and surveyors would be much more benefited by English investments than by investments going into foreign countries. Turning to the style of architecture adopted in Sheffield, he said the Sheffield man was a shrewd business man, who, as a rule, wanted to see a fair return upon his capital. In his recent visit to Vienna and Budapest he had noticed that enormous sums of money must have been spent upon the buildings, and when he approached the native on the subject he was told that they took a pride in their buildings. The class of building seen in the ordinary streets of the two towns referred to was much superior to anything in Sheffield.

Mr. F. E. P. Edwards also replied.

"The Sheffield Master Builders' Association and President" was proposed by Councillor J. Dawson (Huddersfield), and responded to by the President, who also made reference to the hard times the builders were going through. With regard to the Association, however, things were brighter, for there had been forty-seven new members admitted during the year, and consequently the organisation and finances had been put on a satisfactory and progressive basis.

## LONDON AND DISTRICT BOROUGH COUNCILS.

*Bethnal Green.*—The Electricity Committee has had under consideration the reference to them from the Council as to the desirability of taking steps to secure a supply of energy for the borough, and to obtain schemes for that purpose. The Committee have instructed the Town Clerk to invite proposals from the several authorities and electrical undertakers authorised to supply within the borough current in bulk or otherwise.

*Camberwell.*—Part of Ruskin-walk and Dekker-road are to be made up as new streets, at an estimated cost of 961*l.* and 293*l.* respectively. The Borough Engineer has drawn attention, in connexion with the Bermondsey gas explosion in December last, to the practice which several companies adopt of laying their mains through the brickwork of sewers, gullies, and manholes, and other work in direct communication with the sewers. He points out that wherever mains are so run through and built into the brick or concrete work, and there is a settlement of the adjoining ground, the two are sure to be affected unequally, and in consequence the weaker has to give way, this usually being the main. When this happens the water or gas is bound to find its way into the sewer, which thus immediately becomes a source of danger. A copy of the Engineer's report is to be forwarded to the Local Government Board and the Board of Trade.

*Hampstead.*—The upper portion of Adelaide-road is to be paved with creosoted deal blocks on a 9-in. concrete foundation, at an estimated cost of 4,783*l.* Upper Avenue-road, at its intersection with St. John's Wood-road, is also to be paved with wood blocks, the cost in this case being put down at 753*l.* Underfeed mechanical stokers, to cost 325*l.*, are to be installed at the Central Baths.

*Finchley.*—Amongst the plans passed by the Council last week were the following:—Mr. H. Watts, seven houses, Dudley-road; Finchley Co-Partnership Society, four houses, Village-road; Messrs. Ridout Brothers, two houses, Great North-road, Whetstone; Mr. J. Webb, two houses, Great North-road, Whetstone.

*Fulham.*—In regard to the Stanley Bridge improvement, the proposed gradient of the approach from the Fulham side is to be lowered to one in twenty-five. This will entail an additional expenditure of about 400*l.* The effect of the above decision is that the apex of the surface of the bridge will be 15 in. lower than originally proposed, but 5 in. higher than that of the existing structure. It is proposed to asphalt side streets off Field-road, mainly for sanitary reasons. As an experiment, a trial is to be made in Hatfield-street. The work is to be done by the Borough Surveyor, at an estimated cost of 92*l.* The Council has passed plans for Mr. G. A. Gale, The Broadway, Walham Green, S.W., for alterations to 482 and 484, Fulham-road.

*Hammersmith.*—Tenders are to be invited for the supply and fixing of new panels to main switchboard at the generating-station.

*Hendon.*—The following plans were passed at the last meeting of the Council:—Messrs. W. Mass & Son, houses, Wood-lane, Wildhatch, Hampstead Way; Mr. A. Beswick, motor garage, North End-road; Hampstead Tenants, Ltd., four houses, Willifield Way, and twelve houses, Erskine-hill, and two houses, Temple Fortune-road; Mr. A. Bretyfelder, two houses, Hampstead Way; Mr. L. Blake, eight cottages, Hill View-road, Mill Hill; Mr. E. Streather, three houses, Golder's Green-road; Mr. Reeves, two shops, Edgware-road, corner Colindale-avenue; Mr. H. A. Welch, houses, Rathwick-road; Mr. W. J. King, two houses, Park-drive.

*Holborn.*—Notice is to be given to determine various contracts for the maintenance of asphalt paving. Four hundred tons of old granite pitchings have been removed from the site of the construction of the sewer in Malet-street.

*Southwark.*—The cost of breaking up disused sewers in the borough is estimated at 189*l.* 12s. The local authority is to fill in some of these at a cost of 53*l.* 12s., and property owners and the London County Council are to be asked to undertake the remainder of the work. An application by the Tramways Manager of the London County Council to lay ducts in Westminster Bridge-road has been granted. A separate entrance is to be made to the warehouses in Greenmore Wharf, at a cost of 230*l.* The London County Council is to be again asked to carry out the widening of Union-road. Mr. Douglas Young has been appointed surveyor and valuer on behalf of the Borough Council in the matter of the East-street improvement.

*Walthamstow.*—The District Council has passed the following plans:—Mr. W. Percival, eight houses and one shop, Shernhall-street; Mr. W. Sizer, two houses, Woodlands-road; Mr. H. Brodey, three houses, Gloucester-road; Mr. G. F. Hillman, three houses, Howard-road.

*Westminster.*—Mr. John Murray, F.R.I.B.A., 11, Suffolk-street, Pall Mall, has prepared sketch plans of the proposed disinfecting-station, residences, etc., to be built on the Grosvenor-road property on the west side of the lock. He reports that it would be advisable to keep the disinfecting-station separate from the residences, offices, etc., instead of erecting one combined building as originally proposed. The cost of the disinfecting-station will be approximately 5,140*l.*, and if the machinery stored at Ebury Bridge depôt is used, 500*l.* to 600*l.* will cover the cost of the necessary engineering works. The estimate for erecting the residences, offices, etc., is about 5,000*l.* The special committee of the City Council, who have charge of the matter, have approved of Mr. Murray's sketch plans, and he is to be instructed to proceed with the working drawings. The Committee have further decided in favour of Messrs. Fowler & Hugman, 9, Adam-street, Adelphi, W.C., being asked to prepare the necessary quantities at 1½ per cent.; failing the firm named, Messrs. J. Rider Hunt & Co., 181, Queen Victoria-street, E.C., are to be offered the work. Tenders are to be invited in due course for the erection of the buildings. The Finance Committee have passed an estimate for 250*l.* for a new 9-in. pipe sewer in Crown-court, Russell-street. The Public Health and Works Committees have considered a circular letter from Hampstead Borough Council drawing attention to a decision of the Divisional Court that the proper person to be summoned for infringement of the plan and drainage by-laws of the London County Council is the person who ordered the

work to be done. The above-named Committees took the opinion of counsel (Mr. Courthope Munroe) on the matter, and this opinion is to the effect that the judgment of the Divisional Court is directly contrary to the practice which has obtained throughout the metropolis in the past. With a view of the by-laws being amended in such a manner as will enable sanitary authorities to proceed against the builder in addition to the owner of the property, in cases of breaches of the by-laws, a communication is to be addressed, on the advice of Mr. Munroe, to the London County Council.

*Woolwich.*—Part of Alabama-street is to be made up, at an estimated cost of 1,120*l.* Plans have been passed for Mr. A. C. Corbet (per Mr. J. J. Bassett, 121, Earlshall-road, Eltham) to build four houses at Glenhouse-road, Eltham.

## General Building News.

NEW CHURCH, CRAIL.

Owing to the amalgamation of the North Free and the West U.F. Churches in Crail, a central building for joint worship is being built, to accommodate about 600, at an estimated cost of 3,800*l.* The contractors for the building are:—Mason, Mr. J. G. Gay, Crail; joiners, Messrs. Henderson & Wilson, Leith; plumber, Mr. Knox, Edinburgh; slater, Mr. Black, St. Andrews; plasterer, Mr. Wilson, Pittenweem; heating apparatus, Mr. Philp, Edinburgh. The other contracts have not yet been settled. Mr. James D. Cairns, of Edinburgh, is the architect.

NEW CHURCH, WESTBURY PARK, BRISTOL.

The dedication has taken place of the new church of St. Albans, Westbury Park. The internal length of the building, when completed, will be 136 ft., and the width across the transepts 68 ft. The plans provide for the following accommodation:—Nave seats, 412; the aisles, 370; the gallery (in the west bay of the nave), fifty-eight; chapel (at eastern end of south aisle adjoining the chancel), sixty. The architects are Messrs. E. G. Rodway & C. F. W. Dening, of Bristol; the general contractors, Messrs. R. Wilkins & Sons, Bristol; and the heating and ventilation scheme carried out by Messrs. J. Crispin & Sons, Bristol. The work has been carried out in local limestone, with dressings of Bath stone, and the roof is covered with green Westmorland slates. The electric lighting contract was entrusted to Messrs. Edwards & Armstrong.

UNITED METHODIST CHURCH, POMPHLETT, DEVON.

An United Methodist church is being built at Pomphlett. Messrs. Hine, Odgers, & May are the architects, and Mr. J. Paynter is the contractor for the work. The estimated cost, including furniture, is 2,100*l.*

CALVINISTIC METHODIST CHAPEL, PONTARDULAIS.

The English Calvinistic Methodists are opening a new chapel. It has been built from designs by Mr. W. Beddoe Rees, Cardiff, the builders being Messrs. A. & A. Thomas, Pontardulais.

SCHOOL CHAPEL, CATTON, NORWICH.

The foundation-stones have just been laid of a new school-chapel which the Wesleyan denomination is erecting at Catton. The building will consist of a central hall measuring 50 ft. by 27 ft., with four classrooms on each side, measuring 12 ft. by 9 ft. A smaller hall in the rear, equipped with offices and classrooms, measures 27 ft. by 13 ft. The building material throughout will be of red brick, with Costessey dressings. Messrs. Boardman & Son are the architects, and the contractor is Mr. John Youngs.

PROPOSED NEW SCHOOLS, PADIHAM.

At a recent meeting of the Padiham Education Committee it was decided to purchase a plot of land for a new Council school at Hapton. The County Architect, Mr. Littler, wrote stating that plans had been drafted for the erection of the new schools at Padiham and Hapton, but building operations could not be commenced before the Local Government Board had sanctioned the loans.

BOARD SCHOOL, CARLUKE.

A new school has been erected at Carluke by the Carluke School Board. The building is intended for the infant and junior classes, and consists of ten classrooms, arranged round a central hall, providing for the accommodation of 570 scholars. The total estimated cost is about 4,750*l.*, and the architects were Messrs. Cullen, Lochhead, & Brown, Motherwell.

MISSION HALL, MANCHESTER.

The memorial-stones were laid on the 24th ult. of the Albert Hall and Aston Institute, Peter-street, Manchester, an enterprise commenced by the Manchester and Salford Wesleyan Mission. It is estimated that the new hall will cost 55,000*l.* Messrs. Morley & Sons, architects, of Bradford and London, are responsible for the plans.

DENBIGH COUNTY OFFICES, RUTHIN.

New offices for the County of Denbigh have now been completed at Ruthin at a cost of nearly 10,000*l.* The architect is Mr. W. D. Wiles, County Architect and Surveyor, Wrexham, and the contractor Mr. Hopkins, Birmingham.

BUSINESS PREMISES, NOTTINGHAM.

New premises are shortly to be erected fronting Upper Parliament-street, Wollaton-street, and Theatre-quadrant. Mr. A. Harrison Goodall, of Nottingham, is the architect, and Mr. G. A. Pillatt, of Sherwood-street North, is to be the builder.

Y.M.C.A. BUILDINGS, PONTYPRIDD.

Work has just been begun on the site of the first block of buildings which are to constitute the new home of the Pontypridd Y.M.C.A. The estimated cost of the whole enterprise is 12,000*l.* The plans are by Mr. Vernon Hodge, London, the winner of the designs competition, which was open to all practising architects in the country.

PUBLIC LIBRARY, KENDAL.

A Carnegie Library has been erected at Kendal at a cost of over 5,000*l.* The work was designed by Mr. T. F. Pennington, architect, and carried out almost entirely by local firms.

NEW POST-OFFICE PREMISES, PETERHEAD, N.B.

The Post Office authorities have secured ground at the corner of Marischal-street and Thistle-street, Peterhead, as a site for a new post-office. The plans have been prepared by Mr. James Watt, C.E., Peterhead, and the estimated cost of the building is about 5,000*l.*

RECONSTRUCTION OF THE GUILDHALL, LONDONDERRY.

The Londonderry Corporation are undertaking the reconstruction of the Guildhall, and Mr. Pinkerton, C.E., has been appointed architect to the work.

PROPOSED IMPROVEMENTS IN THE MIRFIELD DISTRICT.

Mr. A. W. Brightmore, D.Sc., M.Inst.C.E., recently held a Local Government Board inquiry into the Mirfield Council's application to borrow 261*l.* for the widening and improvement of Back Knowl-road and Nab-lane, Mirfield; 622*l.* for the provision of a depôt at Snake-hill; and 621*l.* for sewerage and sewage disposal. Mr. E. Gill, Surveyor, was present at the inquiry, and gave evidence.

PROPOSED BUILDINGS, ST. ALBANS.

The Rural District Council of St. Albans have approved the plans of the following:—Villa in Camp-road, for Mr. F. Glaysher; pair of villas, Blandford-road, St. Albans, for Mr. T. Yates. Approved conditionally:—Cottage, Tyttenhanger-green, for Mr. F. C. Hill; pair of cottages, Colney Heath, for Mrs. Franklin; St. Paul's Church, Hatfield-road.

WEST-END ELECTRIC THEATRE.

Mr. Melville S. Ward, F.R.I.B.A., 100, Victoria-street, S.W., is preparing plans for an electric theatre to be erected on the site of 225, Oxford-street, and 2, 4, 6, 8, and 10, Hills-place. The theatre will include a refreshment lounge, suites of offices, and studios. The London Cinematograph Company, 20, Bedford-street, Strand, is responsible for the enterprise.

NEW BUILDINGS, ETC., HULL.

The Hull Corporation Works Committee have approved the plans of the following:—G. H. Needler, fourteen houses, new street, Marfleet; R. Robinson, two houses, Spring Bank-west, two houses, Sunny-bank; G. Wardell, fourteen houses, new street, Marfleet; A. Arwidson, two houses, Aberdeen-street; Atkinson & Trotter, sixteen houses, Steynburg-street; R. Airey, four houses, Exmouth-street, six houses, Tavistock-street; G. T. Spruit (amended), one house, Chaucer-street; Lison & Harris, three houses, Cottingham-road and Exmouth-street; J. B. McMaster, five houses and one shop, Ryde-street; John Downs, warehouse and office, Wilton-street; Robson's Cement Company, Ltd., additions, Stoneferry; W. Witting (amended), workshop, West-parade; — Nightscales, workroom, Holderness-road; Sissons Brothers, Ltd., chimney and warehouse, Bankside; M. Harland & Son, alterations and additions, Manor-street; Henry Davis, additions, 34, Plane-street; Sculcoates Guardians (amended), drainage, Isolation Hospital, Beverley-road; the Convent, alterations to secondary school, South-parade; Liptons, Ltd., alterations, King Edward-street; Humber Brass and Copper Works (amended), extensions, Waterhouse-lane.

## Miscellaneous.

GOOD FRIDAY WEEK.

In consequence of the Easter holidays, we go to press next week a day earlier than usual. All communications for the Editor must reach him by *first post on Wednesday morning*, except lists of tenders, which will be received up to 9 a.m. of the same day.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.

Professor Henry Adams, M.Inst.C.E., etc., of 60, Queen Victoria-street, has taken his eldest son, Mr. Henry Charles Adams, A.M.Inst.C.E., A.M.I.M.E., A.M.I.E.E., etc., into partnership with him in his practice as a consulting engineer and surveyor, under the style of Henry Adams & Son, at the above address, their Birmingham office being at 1, Waterloo-street.——Messrs. A. J. Gate & Son, quantity surveyors, have removed their offices from 20, Mecklenburgh-square, to No. 35A, Mecklenburgh-square, W.C. (Telephone No. 9052 Central).——Messrs. Philip King & Co., timber merchants and joinery manufacturers, of Waltham Cross, have sold their business to Messrs. King & Scarborough, of Bridge Wharf, 240, Kingsland-road, London, N.E., who will in future carry it on in their own name.——Mr. J. B. Lofting, surveyor, has removed his office from 37, Old Queen-street, Westminster, to 44, Bedford-row, W.C.——Messrs. Siemens Brothers & Co., electrical engineers, have removed from 12, Queen Anne's-gate, to Caxton House, Westminster, S.W.

VICTORIA AND ALBERT MUSEUM.

H.M. Office of Works has informed the Kensington Borough Council that the Board desire on reconsideration to alter the arrangement of the planting of a number of plane trees at regular distances along the frontages of the Victoria and Albert Museum in Cromwell-road in accordance with the plan prepared by Sir Aston Webb. It was originally agreed that the Borough Council officials should carry out the work, but the Office of Works point out that they are responsible for the amenities of the Museum, and ask that their own officials may choose the position for the trees with the advice of Sir Aston Webb. The Works Committee of the Borough Council have no objection to the proposal.

STREET IMPROVEMENTS, DEWSBURY.

Mr. W. A. Ducat, Inspector of the Local Government Board, conducted an inquiry recently at the Dewsbury Town Hall into an application by the Dewsbury Corporation for sanction to borrow 2,857*l.* for purposes of street improvements in Bath-street and Halifax-road, Dewsbury. The Town Clerk, Mr. H. Ellis, said the proposed improvement was a very desirable one, as the Halifax-road at the point in question was very steep in gradient, and very narrow in width. Mr. H. Dearden, the Borough Surveyor, produced a plan showing the works proposed to be carried out.

NATIONAL MEMORIAL TO THE LATE DUKE OF DEVONSHIRE.

The committee for erecting a statue of the late Duke of Devonshire have committed the execution of the statue to Mr. Herbert Hampton. The memorial will be set up in the roadway at the junction of Whitehall and Horse Guards-avenue, upon a site allotted by the Westminster City Council.

VACANT LAND CULTIVATION SOCIETY.

Mr. Joseph Fels, of 39, Wilson-street, E.C., Hon. Secretary to the Society, asks for contributions in kind, in the form of plants, vegetable seeds, and tools, in respect of a considerable amount of vacant lands which have recently been placed at the Society's temporary disposal, and upon which more than 500 poor men could now be employed. The Society apportion a lot of about 20 sq. rods to each labourer, who reaps the produce for his own benefit, and free of all charges.

THE ROYAL SANITARY INSTITUTE.

At an Examination in Sanitary Science as Applied to Buildings and Public Works, held at Blackburn on March 26 and 27, the following two candidates presented themselves, and were granted a certificate:—James Bolton (Blackburn); Owen H. Williams (Blackburn).

THAMES CONSERVANCY.

At the meeting of the Board on Monday, the following applications were granted:—Mr. A. W. Mayo Robson, Moulsford (per Messrs. Smallbone & Sons), to construct four new boat-houses at Moulsford; Mr. C. Ashworth (on behalf of Mrs. A. M. Crawshay, Teddington), to discharge the surface water from a building estate which is being developed between Lale-ham-road and Staines railway bridge, under the towpath by means of a 12-in. drain; the London County Council, to embank the frontage of their premises in Deptford Creek,

and remove a projecting corner; Carron Company, Edinburgh, to extend by 20 ft. at its lower end the head of the jetty off their premises, London and Continental Wharf, Lower East Smithfield; Limmer Asphalte Paving Company, Ltd., Moorgate-street, to construct an embankment and form a chalk barge bed off their premises, Leamouth Wharf, Bow Creek.

FOREIGN HOUSE JOINERY.

In the Parliamentary papers last week Mr. asks the Board of Trade what has been the percentage of unemployed carpenters and joiners and the value of imported manufactured house joinery during each of the ten past years.—Mr. Tennant gives complete figures to both questions for the last six years. The mean monthly percentages of carpenters and joiners reported as unemployed in trades unions were:—1903, 4·4 per cent.; 1904, 7·3 per cent.; 1905, 8 per cent.; 1906, 6·9 per cent.; 1907, 7·3 per cent.; and 1908, 11·6 per cent. The imports of house frames, fittings, and joiners' work during these years were:—1903, 469,227*l.*; 1904, 332,627*l.*; 1905, 317,288*l.*; 1906, 272,949*l.*; 1907, 224,596*l.*; and 1908, 209,632*l.*

QUEEN VICTORIA MEMORIAL.

Replying in the Parliamentary papers last week to Sir William Collins, Mr. Harcourt states that a large portion of the sculpture of the Queen Victoria Memorial in St. James's Park is completed, and arrangements have been made to begin fixing it as soon as possible. The fountains and marble work around the base have been finished, and it is intended to remove the hoarding during April, when they will be visible to the public. It is not possible to name an actual date of completion.

HOUSING AND TOWN PLANNING BILL.

At the annual meeting of the Association of Municipal Corporations, held recently at the Guildhall, London, the Council reported on the Housing and Town Planning Bill, and pointed out that clause 30 of the amended Bill, which directs a quinquennial survey and register to be made by the local authority of all houses in towns of 50,000 inhabitants, or upwards, not exceeding a rental of 26*l.* per annum, and in smaller places 16*l.* In the opinion of the Council this clause, if again attempted to be reintroduced, should be opposed.—Mr. Harwood Banner, M.P., in proposing the adoption of the report, remarked that the Bill would require the careful scrutiny of members of the Association. It would neither be in the interests of the municipalities nor of economy of administration that the Act should give the Local Government Board or the County Councils too great a power of control or initiative.

MIDDLESEX COUNTY COUNCIL.

At the meeting of the County Council on March 25, it was mentioned in connexion with the conversion of the higher elementary school at Finchley into a secondary school that additional lavatory and office accommodation would probably have to be provided, and also a manual training centre. This it was estimated would cost 800*l.* In addition a permanent fence will have to be placed in the near future upon a portion of the boundary. It was agreed to erect a mixed secondard school at Ashford with 200 places, at an estimated cost as follows:—Buildings, 8,000*l.*; furniture and fittings, 1,000*l.*; clerk of works, 150*l.*; fencing, levelling, etc., 500*l.* Plans having been agreed between the County Engineer and the engineer to the London and North-Western Railway Company for the reconstruction and widening of the Company's Harrow-road bridge, necessitated by the widening of Harrow-road for the purpose of the construction of a tramway. It was decided that the work should be carried out by the railway company at the cost of the Council. The County Engineer was instructed to prepare plans for a proposed tramway from Hertford-road, along Southbury-road, to near Enfield Town Station.

LONDON BUILDING WORKS.

Messrs. Kelly & Dickie, architects, 466, Oxford-street, W., have prepared plans for a Roman Catholic church in High-road, Lewisham. Mr. F. Bush, builder, 8, Ridgmount-street, W.C., is to erect twenty-six shops in Piccadilly-arcade.

LONDON CHAMBER OF COMMERCE.

The twenty-seventh annual meeting of the members of the London Chamber of Commerce took place on Thursday. The report of the Cement Trade Section set out that Mr. Charles Charleton was re-elected Chairman, and Mr. S. Lee Smith, Deputy Chairman. Five meetings were held during the course of the year. The Chairman of the Section received a communication from the Royal Institute of British Architects with reference to the delivery of Portland cement, and proposing that the number of bags to the ton should be definitely fixed at eleven. In view, however, of the varying customs in vogue in different parts of the country, the Section decided that they could not do more than suggest that the members of the Association should make it a rule when ordering cement to stipulate the number of bags, and thus contribute towards ultimate uniformity. A more important question, however—namely, the custom prevalent to a certain extent in the trade of selling Portland cement by eleven bags of 200 lb. each, instead of the standard ton of 2,240 lb.—was brought forward for consideration, and it was decided to convene a conference of manufacturers and merchants both members and non-members of the Chamber. As a result of the recommendations of this conference the Section adopted the following resolutions:—"That this meeting of cement manufacturers and merchants agrees forthwith to quote, sell, load, and deliver Portland cement according to the standard ton of 2,240 lb. only, and to load such cement, when supplied in bags, so that the ton of 2,240 lb. is contained in a certain number of bags. This resolution to apply to cement quoted for and supplied in Great Britain, but not to cement delivered in casks when quoted for and sold by a specific weight per cask. That the Secretary be instructed to send a copy of the foregoing resolution to cement makers and merchants, builders and contractors who are members of this Chamber, to the Institutes of Engineers and Architects, and also to all Chambers of Commerce in the United Kingdom, with a special request (subject to local permission being obtained) that all cement makers and merchants, builders and contractors who are members thereof be advised of same. Such copies of this resolution to be accompanied by an explanation that it has been the custom of some cement makers and merchants to quote and supply eleven bags of 200 lb. each instead of the standard ton of 2,240 lb."

ST. PAUL'S CATHEDRAL, CALCUTTA.

An addition has recently been made to the internal decoration of this building. Two blind windows in the eastern wall—one on either side of the east window—have always been considered a great disfigurement. It was impossible to fill them with glass, as the external buttresses supporting the east wall rested against them. The problem has now been solved by filling them with panels of *opus sectile*, more or less in character with the panels of the reredos immediately below. Two of the panels represent respectively "The Raising of the Daughter of Jairus" and "The Healing of the Lame and the Blind," whilst two others portray Christ blessing little children. The work has been executed by Messrs. James Powell & Sons, of Whitefriars. The cathedral, which was consecrated in 1847, contains a stained window, by Burne-Jones, erected by the Government of India in memory of Lord Mayo; an alabaster reredos with panels in Florentine mosaic, by Sir Arthur Blomfield; and the statue of Bishop Heber, by Chantrey, a replica of which is in St. Paul's Cathedral, London.

THE FONT, HENDON CHURCH.

The parish church of St. Mary, for the renovation and enlargement of which Mr. Temple Moore was appointed architect about ten months ago, contains an early XIIth century font. It consists of one block of stone, apparently of oolitic limestone from the Portland beds, square in shape, with an outside diameter of 2 ft. 11 in., and a height of 1 ft. 7 in. The inside of the bowl, which is also square, and measures 2 ft. 1 in. by 1 ft. ½ in., is lined with lead, and has a drain. On each of the four exterior sides is a sculptured intersecting Norman arcade with a kind of beaded moulding, irregularly spaced, and having plain columns and capitals; over the arcade is a simple moulding; at its base, all round, is a course of foliated ornament broken on one side with a few diamonds in high relief. The font rests upon two stone slabs comparatively modern in date; the cover, of oak, is carved with a rectilineal pattern. In Domesday the manor is described as being assessed for 2,900 acres held by the Abbot of Westminster, and there is mention of a priest. Garrick, who lived for a while at Hendon Hall, bought the manor and advowson in 1756. There is a monument, by Flaxman, to some of the Colmore family; in the churchyard were buried Rundell, the goldsmith, of Ludgate-hill; Sir Joseph Ayloffe, Bart., the antiquary; A. Raimbach, the engraver; and Nathaniel Hone, R.A.

ART IN TURKEY.

It is interesting to note that nowadays Turkey can spare some thought from her political warfare and engage in an ideal struggle for the furtherance of art within her borders. The Municipality of Constantinople has invited over two architects from Paris in order that they may transform the ancient Byzantium in accordance with modern taste. The misconception generally obtains that the Turk is incapable of intellectual effort, devoid of artistic sense, opposed to progress, rebellious of civilisation. Yet Galland, the eminent Orientalist, who devoted his life to the study of the Arabs, Turks, and Persians, wrote in the beginning of the XVIIth century that the Turks yielded no whit to the Arabs and Persians in the literature and sciences common to the three nations, which they had cultivated almost from the commencement of their Empire. Adolphe Thalasso, an eminent present-day Orientalist, considers the Turk's intelligence far above the average. In the higher grades of society nearly all are versed in the sciences and cultivate literature and art. It is only a wrong interpretation of the precepts in the Koran which makes them suspicious of that branch of art which deals with the reproduction of the human figure. When Sultan Abdul Hamid succeeded in 1876 classical art was a dead letter in Turkey. It was only represented by architecture and calligraphy. De Hammer in his voluminous "History of the Ottoman Empire" mentions only one painter, the poet Négari, who, under Mourad III., produced pictures which were as bad as were his verses. In 1883, under the reign of the actual Sultan, the Imperial School of Art was officially founded in Constantinople. The first Director was Hamy Bey, a painter of great talent. Artists of repute were called upon to hold classes in the new institution, notably Osgan Effendi, a sculptor who had studied in Paris, and Valéry, a Greek architect whose fame has long since spread beyond the horizon of the Bosphorus. The first art exhibition was held in Constantinople in 1874, initiated by Ahmed Ali Pasha, who had studied painting in the Ecole des Beaux-Arts. In 1877 canvases were sent over by Oriental painters, and exhibited in the Théâtre des Petits-Champs. Between 1901 and 1904 much interest was concentrated around the "Constantinople Salon," but unfortunately since then this has flagged, and there have been no further public exhibitions. It is to be hoped that with the universal sympathy now extended to Turkey and her enfranchisement from all prejudices that a better future is in store for the art of that country.

WORKHOUSE BUILDINGS.

According to the annual Report of the Local Government Board, which was recently issued, it appears that the expenditure for erection, enlargement, etc., of workhouses, separate workhouse schools, infirmaries, relief offices, etc., and purchase of sites for same during the twelve months ending March 31 last totalled 412,146*l.*, bringing the total amount authorised under this head to 32,889,405*l.* The principal works authorised during the twelve months under review were as follows:—Bermondsey, additions and alterations to infirmary at Rotherhithe, 46,000*l.*; Bolton, extension of infirmary at workhouse and erection of residence for medical officer, 11,568*l.*; Dewsbury, extension of infirmary at workhouse, 10,000*l.*; Hackney, erection of additional pavilion at infirmary, 21,050*l.*; Poplar, erection of schools and fittings, fixtures, etc., in connexion therewith, 17,702*l.*; South Shields, erection of homes for children at Whitburn and erection of receiving home for children at workhouse, 14,459*l.*; Sunderland, erection of cottage homes for children, fittings, fixtures, furnitude, etc., 12,850*l.*; Willesden, erection of additional buildings for workhouse, 24,000*l.*

KING HENRY I. MEMORIAL, READING ABBEY.

The Town Council of Reading have accepted an offer made by Dr. Jamieson B. Hurry, of Reading, to erect in Forbury-gardens, on the site of the Abbey church, a memorial to Henry I. The memorial will consist of a granite cross, 20 ft. high, designed after the early English style, by Mr. W. Ravenscroft, F.S.A. King Henry I. founded, in 1121, on the site of the first church of St. Lawrence, the Benedictine Abbey of the Holy Trinity, the Virgin, and St. John the Baptist, which he amply endowed and erected into a mitred abbey with rights to coin money and confer knighthood, and with several other privileges. Henry I. and his Queen, Adeliza of Louvaine, were buried in the abbey church, the materials of which were largely used for the building, in or about 1550, of the parish church of St. Mary. A similar fate befell the greater part of the conventual buildings, but the abbey gate, some remains of the abbey mill, and portions of the church walls, and the great hall have remained to our own time. Some years ago the Corporation bought the old buildings of the Hospitium of St. John the Baptist, appertaining to the abbey, which, together with the second church of St. Lawrence, Abbot Hugh built in 1192-6. Upon the XIIth-century foundations had been built,

*temp.* Henry VI., a poor travellers' hospital, whereof a portion was restored in 1892 at the cost of the Corporation, and converted for purposes of Reading University Extension College under the directions of Mr. Slingsby Stallwood as honorary architect.

## Capital and Labour.

EMPLOYMENT IN THE BUILDING TRADES.

According to the *Board of Trade Labour Gazette*, employment in February was slack in all parts of the United Kingdom. It showed a slight improvement compared with January, but was worse than in February, 1908. During part of the month building operations were seriously interfered with by frosty weather. Returns received from 721 firms employing 39,154 workpeople at the end of February show that in London, in the case of skilled workmen, there was an increase in the number employed of 8·9 per cent., compared with a month ago, and an increase of 2·3 per cent. compared with a year ago; while in the case of labourers there were increases of 4·1 per cent. compared with a month ago, and of 1·9 per cent. compared with a year ago. In the provinces the increase in the number employed compared with a month ago amounted to 4·4 per cent. in the case of skilled workmen and 0·9 per cent. in the case of labourers; while, compared with a year ago, there were decreases of 15 per cent. in the case of skilled men, and of 23·4 per cent. in the case of labourers. The percentage of trade union carpenters and joiners unemployed at the end of February was 14·5 as compared with 16·3 a month ago and 11·2 a year ago; and for plumbers, at the same dates, the percentages were 12, 10·3, and 12·4 respectively. For London the trade union returns show that 11·8 per cent. of carpenters and joiners were unemployed, as compared with 15·2 a month ago and 11·9 a year ago; the corresponding percentages for plumbers were 15·6, 11·2, and 15·8 respectively. Employment was slack in nearly every large centre.

## Law Reports.

### REVOCATION OF PATENT FOR IMITATION STONE SLABS OR TILES.

MR. JUSTICE PARKER, in the Chancery Division, on the 26th ult., delivered judgment in the case of *in re* Hatscher's Patent, *ex parte* Zerenner, on appeal from a decision of the Comptroller-General of Patents, Designs, and Trade Marks, revoking letters patent Nos. 6,455 and 22,139 of 1900, granted to Ludwig Hatscher, of Vocklabruck, Upper Austria, for a process of manufacturing their imitation stone plates or slabs or slates, the main feature of which was the mixing of a fibrous substance, preferably asbestos, with an adhesive substance such as cement. The revocation was made by the Comptroller by virtue of sect. 27 of the Patent and Designs Act, 1907, which provides that at any time not less than four years after the date of a patent, and not less than one year after the passing of the Act, any person may apply to the Comptroller for the revocation of the patent upon the ground that the patented process is carried on exclusively or mainly outside the United Kingdom, and the Comptroller may, unless the patentee proves that the process is carried on to an adequate extent in the United Kingdom, or gives satisfactory reasons why the process is not so carried on, make an order revoking the patent, either forthwith, or after such reasonable period as specified in the order, unless in the meantime it is shown that the process is carried on in the United Kingdom to an adequate extent. The applicant for revocation was Mr. C. W. Zerenner, and the opponents to the order for revocation were the patentee and a Belgian company called the Société Anonyme Eternit, the exclusive licensees in the United Kingdom.

Mr. Justice Parker, in the course of an elaborate written judgment, said that the important point was that, though in commercial operation in Germany, France, and Belgium, the invention had never been worked in this country. Clearly, therefore, the patentee was put on his defence, and the only question therefore was whether he had given satisfactory reasons for that state of affairs. It appeared that, having obtained the English patents and corresponding patents in the countries he had mentioned, the patentee devoted himself to the establishment abroad of industries in which the patented process was carried on, using the monopoly conferred upon him by his patents in this country, not for the purpose of establishing a new industry here, but in order to secure to some foreign licensees the monopoly of selling in this country articles manufactured abroad. In his lordship's opinion a new industry might have arisen in this country but for the manner in which the patentee had exercised his patent rights; but it was quite enough to say that there was no satisfactory evidence that a new industry would not have arisen here if the patentee had exercised his patent rights fairly as between this country and foreign countries. Nothing had been proved either as to the relative cost of material, or wages, or as to difference in local conditions, which pointed to the economic impossibility of such an industry having grown up in the United Kingdom if no preference had been conferred upon foreigners. Possibly a foreigner might have had to be content with smaller profits than a manufacturer abroad, but even that was not proved. It was said that the demand here was too small to justify the expense entailed in laying down the necessary plant, but there was no evidence, or at any rate no satisfactory evidence, that the demand would not have been much greater than it was, but for the manner in which the patentee had used his monopoly. The licencee had exercised powers granted to him by the licence not to erect factories here, but to import his foreign made goods into this country, excluding any competition between such goods and goods made in this country or elsewhere abroad. He saw no reason why the patentee should be entitled to any indulgence, even if indulgence could be granted. Under all the circumstances he thought that the revocation of the patent was amply justified, and he was further of opinion that the refusal of the Comptroller to suspend the revocation was also right. He therefore affirmed the decision of the Comptroller and dismissed the appeal with costs.

### BUILDING OWNER'S ACTION FOR ALLEGED NUISANCE.

THE case of Naylor *v.* the Park Gate Iron and Steel Company, Ltd., came before the Court of Appeal, consisting of Lords Justices Buckley and Kennedy and Mr. Justice Joyce, on the 30th ult., on the application of the defendant company for judgment or new trial in the action which was tried before Mr. Justice Grantham and a special jury at the Leeds Assizes.

Mr. Tindal Atkinson, K.C., and Mr. Longstaffe appeared for the appellants, and Mr. Scott Fox, K.C., and Mr. Ellison for the respondent.

Mr. Tindal Atkinson said that the grounds of the application were that the learned judge had misdirected the jury, and that the verdict was against the weight of the evidence. The action was brought by the plaintiff for an injunction and damages in respect of an alleged nuisance committed by the defendants by reason of noise, smoke, noxious fumes, and dust. The trial, which lasted four days, resulted in a verdict for the plaintiff for 150*l.* damages, and the learned judge granted an injunction restraining the continuance of the nuisance arising from the fumes and dust by the defendants. Plaintiff was a doctor living at Park Gate, which was in the midst of a manufacturing district, being about six miles from Sheffield. Defendants had large steel works in that town and employed about 1,700 workmen. Defendants' works were started in 1820 and were purchased by the defendants in 1864. In 1898 the plaintiff, who was a doctor, purchased at Park Gate about 5 acres of land, at which time there existed upon the defendants' premises four or five blast furnaces open at the top, and at that time there were, and had been for many years, a number of industrial works in the immediate neighbourhood. Plaintiff leased certain portions of his land to builders, who had erected upon the portions so leased workmen's cottages, and the plaintiff also erected upon another portion of the land a house for his own occupation. In 1905 the defendants erected two blast furnaces, which were about 270 yds. away from the plaintiff's property, and it was these two furnaces which the plaintiff alleged occasioned the nuisance complained of.

Mr. Scott Fox said that the plaintiff did not then complain of any nuisance arising from smoke.

Mr. Tindal Atkinson said that at the trial the plaintiff's case, based upon noise and smoke, was abandoned, and the case proceeded upon the case founded upon noxious fumes and dust.

The learned counsel, having read the evidence given at the trial, contended that the verdict was against the weight of the evidence, and that the learned judge had misdirected the jury in not explaining to them what a legal nuisance was.

In the result their lordships, without calling upon counsel for the respondent, held that there was evidence to justify the verdict, and that the learned judge had not misdirected the jury. The appeal was accordingly dismissed with costs.

### AN IMPORTANT QUESTION FOR THE TRADE.

ON Tuesday, at the Guildhall Summons Court, before Alderman Sir Vezey Strong, William Musgrove, in the service of Messrs. Charles Gude, builders' contractors, 177, Dalston-lane, Hackney, appeared to a summons for removing material arising from the demolition of a building during prohibited hours. P.C. Garrett stated that at 5.20 on the afternoon of March 19 he saw a horse and cart drawn up alongside a building in course of demolition in Cheapside, near the "big tree." He saw the cart was being loaded with brick, wood, and a "kind of chalky substance." Defendant, who was foreman of the job, said he should continue to load, as the material came from excavation. When told he would be summoned, he said "All right."

Defendant said the constable had made a mistake. The material being removed did not arise from demolition at all; as a matter of fact, no pulling down had been done there for several days, as the adjoining property had to be shored up for safety. The material complained of came from 17 ft. below the footway; in fact, they had to dig 20 ft. to get their shores in, and excavations were permitted all day long.

Sir Vezey Strong said he imagined the prohibition was to prevent obstruction in the busiest part of the day, and but for the demolition there would have been no need for the excavations, and so the excavations were part of the work of demolition.

Mr. Thos. Edwin Hutchinson, builder's foreman, a witness in the case, argued that it might as well be said rebuilding was part of the work consequent upon demolition.

Sir Vezey: You might elect to leave the site vacant.

Hutchinson: Not in the City, sir.

Sir Vezey: It would hardly pay, I know.

Defendant said his firm had done a lot of "big pulling-down jobs in the City"; this was the first complaint he had had.

Mr. Hutchinson said a different set of men were put on pulling down to those who did excavating—the latter was done by navvies, the former by house-breakers.

Sir Vezey: This is a very interesting point for discussion.

Hutchinson: It is an essential point for the building trade of London, sir.

Sir Vezey: I hold that an offence under the Act has been committed, but, believing defendant acted under a misapprehension, I shall only fine him 2s. 6d. and the costs.

## Patents.

APPLICATIONS PUBLISHED.*

4,700 of 1908.—Edward Gottfried Christian Leopold Meyer and Henry Ferdinand Johannes Holst: Staiths with hoisting and tilting platforms.

6,809 of 1908.—Nicol Sinclair Arthur and Arthur Patent Roller Bending Machine Company, Ltd.: Machines for bending and straightening metal bars and beams.

7,765 of 1908.—Harold Moore: Sash windows.

9,062 of 1908.—Frederick William Hannemann and Oliver Nilson: Brackets for window blind rollers.

9,378 of 1908.—Frank Wilford Mellowes: Glazing.

9,701 of 1908.—Francis Joseph Twigg: Fastening for casements.

11,178 of 1908.—Carl Hertz: Device for locking windows in open position.

11,268 of 1908.—William Alderson: Means for holding or retaining sliding window sashes in any required position.

11,556 of 1908.—William Trueman: Machines or tools for making wall ties.

11,844 of 1908.—John Edward Lucas: Means of hauling for lifts, hoists, and the like.

12,159 of 1908.—Julian O. Ellinger: Reinforcements for concrete constructions such as beams, girders, or the like.

12,539 of 1908.—The Camelon Iron Company, Ltd., and John Charles Jeffrey Smith: Domestic fireplaces.

14,342 of 1908.—Richard Berner, Emanuel Frankl, and Dr. Moses Mendelsohn: Process for the manufacture of artificial stone.

21,909 of 1908.—Alexander Novitzki and Boleslaw von Ostrowski: Door, gate, and like fastenings.

22,205 of 1908.—Alfred Francis Papin and George Henry Rogers: Imitation tiling.

22,396 of 1908.—Robert Brown: Jointing water, drain, and other pipes.

25,994 of 1908.—William Ralston Carson: Fastening for doors, windows, and the like.

* All these applications are in the stage in which opposition to the grant of patents upon them can be made.

# List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, iv.; Contracts, iv. vi. viii. x. xii.; Public Appointment, xix.; Auction Sales, xxviii.

Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bonâ-fide tender unless stated to the contrary.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

*** It must be understood that the following paragraphs are printed as news, and not as advertisements; and that while every endeavour is made to ensure accuracy, we cannot be responsible for errors that *may* occur.

## Competitions.

APRIL 6.—**Chard, Somerset.**—WATER SUPPLY.—A premium of 20*l.* is offered by the T.C. for the most effective and economical scheme for providing the Borough with a sufficient quantity of pure water. Mr. S. G. Rogers, the Borough Surveyor, will meet intending competitors at his office by appointment.

* JUNE 15.—**Reading.**—OFFICES.—The Berkshire C.C. invite competitive designs for proposed new offices, committee-rooms, etc., at The Forbury, Reading. See advertisement in this issue for further particulars.

JULY 31. — **Glasgow.** — LAYING-OUT LAND.—The Patrons of the Royal Incorporation of Hutchesons' Hospital in the City of Glasgow invite competitive designs for laying-out for feuing and building their lands of Thornliebank, in the Parish of Eastwood and County of Renfrew, near the City of Glasgow. The terms and conditions of the competition, and, upon deposit of 3*l.* 3s., skeleton plans showing the situation and boundaries of the different portions of the lands, may be had from the Chamberlains of the Hospital, Messrs. Hill & Hoggan, 194, Ingram-street, Glasgow, with whom designs must be lodged not later than July 31, 1909. Premiums of 100*l.*, 75*l.*, 50*l.*, and 25*l.* respectively will be awarded.

## Contracts.

### BUILDING.

APRIL 5.—**Bingley.**—COLLEGE.—The West Riding Education Committee invite whole or separate tenders for the erection of a training college at Bingley. Plans may be seen and specifications, etc., obtained, on application to the West Riding Architect, County Hall, Wakefield. A deposit of 1*l.* must be sent by separate letter to the West Riding Treasurer, County Hall, Wakefield.

APRIL 5.—**Edinburgh.**—STAIR, ETC.—Edinburgh P.C. invite tenders for proposed new service stair and other internal alterations in Council Offices, Castle-terrace. Plans can be examined, and schedule of quantities obtained, at the office of the Architect to the Council, Mr. R. M. Cameron, 53, Great King-street, Edinburgh.

APRIL 5-16.—**Gainsborough.**—SCHOOL WORK.—Lindsey C.C. Education Committee invite tenders for the erection of, or additions to, Elementary Schools, Ropery-road, Gainsborough (new block). Bills of quantities, etc., may be had on application to Messrs. Scorer & Gamble, architects, Bank-street-chambers, Lincoln, on payment to them of 2*l.* 2s. The drawings and conditions of contract may be inspected at the offices of the architects.

APRIL 5. — **Holmfirth.**—ALTERATIONS.—Alteration to shop premises in Victoria-street, Holmfirth. Plans, etc., at office of Messrs. Joshua Barraclough & Son, architects, Holmfirth.

APRIL 5.—**Hull.**—ADDITIONS.—Additions to the "Phœnix" Printing Works, Manor-street, Hull, for Messrs. M. Harland & Son. The drawings may be seen, and particulars obtained, on payment of a deposit of 1*l.* Mr. Arthur Easton, architect, 7, Land-of-Green-Ginger, Hull.

APRIL 5.—**Ilford.**—TEMPORARY SCHOOL.—Ilford Education Committee invite tenders for taking down the Uphall Temporary School, in Uphall-road, Ilford, and removing and re-erecting same partly on the South Park School site in Water-lane, Ilford, and partly at Little Heath, Goodmayes, Ilford. Form of tender, etc., may be obtained at the offices of Mr. H. Shaw, M.Inst.C.E., Town Hall, Ilford, upon payment of a deposit of 2*l.* 2s.

APRIL 5.—**Leeds.**—WORKSHOP EXTENSION.—Extension of workshop, near Cookridge-street, Leeds. Forward applications to D 225, *The Yorkshire Post*, Leeds.

APRIL 5. — **Longwood.** — ADDITIONS TO MILLS.—Works (joiners' work excepted) required to be done in the erection of additions to Prospect Mills, Longwood. Plans may be seen, and bills of quantities obtained, at office of Mr. J. Berry, architect and surveyor, 3, Market-place, Huddersfield.

APRIL 5-16.—**Skegness.**—SCHOOL.—Lindsey C.C. Education Committee invite tenders for making additions to an Elementary School at Skegness, in the County of Lincoln. Bills of quantities and form of tender may be had on application to Messrs. Scorer & Gamble, architects, Bank-street-chambers, Lincoln, on payment to them of 2*l.* 2s.

APRIL 5-16.—**South Killingholme and Crosby.**—SCHOOLS.—Lindsey C.C. Education Committee invite tenders for the erection of, or additions to, Elementary Schools, as under:—South Killingholme (new school, with teachers' house), Crosby (additions). Bills of quantities, etc., may be had on application to Messrs. Scorer & Gamble, architects, Bank-street-chambers, Lincoln, and on payment to them of 2*l.* 2s. in each case. The drawings and conditions of contract may be inspected at the offices of the architects.

APRIL 6.—**Bensham.**—GATESHEAD UNION WORKHOUSE.—Works required to be done in executing proposed alterations and additions to the Infirmary at the Workhouse, Bensham. Quantities, etc., at the offices of the architects, Messrs. Newcombe & Newcombe, 89, Pilgrim-street, Newcastle-upon-Tyne.

APRIL 6. — **Exeter.**—SUNDAY-SCHOOL.—Erection of new Sunday-school buildings for the Trustees of Wesleyan Methodist Extension in St. Thomas. Names to Mr. Harbottle Reed, F.R.I.B.A., architect, 12, Castle-street.

APRIL 6.—**Paddock.**—HOUSES.—Erection of three dwelling-houses, Wren-street, Paddock. Plans may be seen, and quantities obtained, at Milnsbridge offices of Messrs. Lunn & Kaye, architects and surveyors, Milnsbridge and Huddersfield.

APRIL 6.—**South Tiverton.**—CONVENIENCE.—The R.D.C. of Bath invite tenders for the erection of a public convenience and for the widening of the bridge carrying the highway over the Somerset and Dorset Railway, known as Claude-avenue Bridge, at South Tiverton, near Bath. Plans, etc., may be seen, and forms of tenders, etc., obtained, on application to Mr. E. H. Sheppard, the Council's Surveyor, at 3, North-parade, Bath. Each contractor will be required to deposit a cheque for 3*l.* 3s.

APRIL 6.—**Stevenage.**—HOUSE, ETC.—Erection of a dwelling-house, bakehouse, stables, mealhouse, etc., at Stevenage, Herts, for Mr. F. Gray. Plans, etc., may be seen at office of Mr. J. Shilcock, Hitchin.

APRIL 6.—**Truro.**—WALL.—The City Council invite tenders for the construction of a retaining wall on the south side of Station-road. Drawings may be seen, and forms, etc., obtained, upon application to Mr. Fredk. A. Barnes, A.M.Inst.C.E., City Engineer and Surveyor, Municipal Buildings, Truro, and payment of 1*l.*

APRIL 7.—**Aberdare.**—HOUSES.—Erection of ten houses at Monk-street and Trevor-street, Aberdare, for the Monk-street Building Club. Plans and specifications may be seen at office of Mr. Thomas Roderick, architect, Clifton-street, Aberdare.

APRIL 7. — **Aberdare.** — VILLAS.—Erection of two semi-detached villas at Monk-street, Aberdare. Plans, etc., may be seen at office of Mr. Thomas Roderick, architect, Clifton-street, Aberdare.

APRIL 7.—**Delgany.**—WORKS AT DISPENSARY.—Rathdown Guardians invite tenders for the erection of counters, presses, and notice boards, putting in hot and cold water supply, and other sundry works at the new dispensary in the village of Delgany. Plan, etc., prepared by Mr George T. Moore, Architect to the Board of Guardians, can be seen at the Clerk's office, Loughlinstown.

APRIL 7.—**Golcar.**—HOUSE.—Erection of one dwelling-house in Leymoor-road, Golcar. Plans may be seen, and quantities obtained, at office of Mr. Arthur Shaw, architect, Golcar.

APRIL 7.—**Huddersfield.**—ALTERATIONS TO CAFE.—Alterations and additions to the Orient Café, New-street, Huddersfield. Plans, etc., may be seen, and quantities obtained, at offices of Messrs. Utley, Hebblethwaite, & Utley, 10, Waterhouse-street, Halifax.

APRIL 7.—**Ledsham.**—HOUSES.—Erection of four single houses, near to Ledsham Station, Cheshire. Plans, etc., can be seen at office of the land agent, the County Estate Office, 49, Northgate-street, Chester, and quantities obtained, on deposit of 1*l.*

APRIL 7.—**Lindley.**—HOUSE.—Works required in the erection of a dwelling-house, boundary walls, etc., in Lea-street, Lindley. Drawings may be seen, and specifications, etc., obtained, at offices of Messrs. John Kirk & Sons, architects, John William-street, Huddersfield.

APRIL 7.—**Lower Shelf.**—COTTAGE.—Erection of a cottage at Lower Shelf, near Halifax. Plans may be seen, and bills of quantities obtained, from Mr. G. Reginald Oddy, architect, Northowram, Halifax.

APRIL 7.—**Pluscarden.**—ALTERATIONS, ETC., TO FARM STEADING.—Mason, carpenter, plumber, and slater works of additions and alterations at the farm steading of Overtown, Pluscarden. The plans, etc., may be seen with Mr. John Wittet, architect, Elgin.

APRIL 7. — **Rathdown.** — COTTAGES.—Rathdown No. 1 R.D.C. invite tenders for building one pair labourers' cottages. Plans, etc., can be obtained from the Clerk to the R.D.C. on payment of 5s. Mr. Patrick Cunniam, Clerk of Council, Loughlinstown.

APRIL 7. — **Swansea.** — THE GLYNN VIVIAN ART GALLERY.—For the erection of the art gallery in Alexandra-road. Names to Mr. Glendinning Moxham, F.R.I.B.A., 39, Castle-street, Swansea, where plans, etc., can be inspected, and quantities obtained, on depositing 5*l.* 5s.

APRIL 8. — **Alves.** — COTTAGES. — Mason, carpenter, plumber, slater, plaster, and painter works of cottages to be erected at Easter Coltfield, Alves. The plans, etc., may be seen with Mr. John Wittet, architect, Elgin.

APRIL 8.—**Bristol.**—SACK SHED, MESSROOM, AND OFFICES, ROYAL EDWARD DOCK.—The Docks Committee invite tenders for the construction, etc., of:—(1) A steel-framed building, covered with galvanised corrugated iron; (2) a small brick building; (3) a small wooden office. Copies of the specification, etc., can be obtained from Mr. W. W. Squire, Engineer, Engineer's office, Cumberland-road, Bristol, on production of a receipt showing that a deposit of 3*l.* has been paid to the Secretary of the Docks Committee, 19, Queen-square, Bristol.

APRIL 8.—**Dewsbury.**—HOUSES.—Erection of three houses situate at Northfields, Dewsbury. Plans, etc., may be seen, and bills of quantities obtained, at offices of Messrs. Kirk, Sons, & Ridgway, F.R.I.B.A., architects, surveyors, and valuers, Market-place, Dewsbury.

APRIL 8. — **Mourneabbey.**—PAROCHIAL HOUSE.—Parochial house at Mourneabbey, Co. Cork, for the Rev. J. Linehan, P.P. Plans, etc., can be seen at the offices of the architect, Mr. Samuel F. Hynes, F.R.I.B.A., 5, South-mall, Cork.

APRIL 8.—**Penmain.**—HOUSES.—Erection of forty houses at Penmain, near Blackwood, Mon., for the "Oakdale Building Club." Plans, etc., may be seen at the offices of the architects, Messrs. Webb & Davies, High-street, Blackwood, Mon.

APRIL 8.—**Pontypridd.**—SHOPS.—Erection of three shops, with offices over, at Mill-street, Pontypridd. Plans, etc., can be seen, and bills of quantities obtained, at offices of Messrs. A. O. Evans, Williams, & Evans, architects, Pontypridd, on payment of a deposit of 2*l.* 2s.

APRIL 10.—**Caistor.**—SCHOOL.—Mr. Ernest Whitlock, architect and surveyor, 26, Scale-lane, Hull, invites single tenders for erection of grammar school, Caistor, Lincolnshire.

APRIL 10. — **Truro.**—TOWER.—The Vicar of St. Paul's Church, Truro, invites tenders for the completion of the tower, from plans, etc., supplied by Mr. E. Sedding, architect, which may be seen at the Vicarage up to April 7, between the hours of 10 a.m. and 2 p.m.

APRIL 12.—**Gelligaer.**—COTTAGES. — Erection of thirty or more cottages at Gelligaer, Village for the Cascade Building Club. Plans, etc., may be seen at office of Mr. Wm. Harris, architect and surveyor, Bank-chambers, Bargoed.

APRIL 13. — **Appleby.** — SCHOOL. — Westmorland County Education Committee invite tenders for erection of a new Elementary School at Appleby. Plans, or copies of the same, may be seen at the County Education Offices, Lowther House, Kendal, or at the Borough Surveyor's office, The Cloisters, Appleby. Quantities may be obtained on application to the architect, Mr. James Hartley, Swadford-chambers, Skipton, on payment of 1*l.* deposit.

APRIL 13.—**Dundee.**—SWIMMING BATH.—The T.C. invite tenders for reinforced concrete foundations, raft, and walls of swimming bath at West Protection Wall, Dundee. Plans, etc., may be seen, and schedules of quantities, etc., obtained, at the office of Mr. Jas. Thompson, City Engineer, 91, Commercial-street, Dundee.

APRIL 13.—**Esh and Annfield Plain.**—SCHOOL WORKS.—The C.C. of Durham invite tenders for new cookery centre at Esh and alterations and improvements at Annfield Plain Infants' Council School. Plans, etc., may be seen, and bills of quantities obtained, as follows:—(1) Esh Cookery Centre—At the office of Mr. F. E. Coates, Shire Hall, Durham; (2) Annfield Plain Infants' Council School—At the office of Mr. W. Rushworth, Shire Hall, Durham.

* APRIL 13. — **North Reddish.** — SCHOOL. — The Stockport Education Committee invite tenders for new infants' school in Lewis-road, North Reddish. See advertisement in this issue for further particulars.

APRIL 13.—**Wawne, Burstwick, etc.**—SCHOOLS.—The Education Committee of the East Riding of the County of York invite tenders for (*a*) the erection of a Council school to accommodate eighty-nine children at Wawne; (*b*) the erection of a cloak-room, etc., at the Council school at Burstwick; (*c*) for alterations and additions to the Council school at Ryhill-cum-Camerton. Plans, etc., may be seen, and forms of tender obtained, on application to the Building Surveyor, County Hall, Beverley. Quantities in respect of the Wawne School only can be obtained upon depositing 1*l.* 1s.

APRIL 14. — **Brampton.** — POLICE-STATION. — Small alterations at the Police-station. Names to Mr. Geo. Dale Oliver, County Architect, Carlisle.

APRIL 14.—**Combe Hay.**—SCHOOL.—Somerset C.C. Education Committee invites tenders for the building of a new Council School at Combe Hay. Drawings, etc., can be seen at, and bills of quantities, etc., obtained from, the office of Mr. W. F. Bird, Midsomer Norton, and drawings, etc., can also be seen at the school.

APRIL 14. — **Dowlais.**—ROOFING.—Reroofing the "Mackworth Arms," George-street, Dowlais, for Messrs. A. Buchan & Co. Drawings and specification may be seen at office of Mr. J. Llewellin Smith, M.S.A., architect, Aberdare.

* APRIL 14.—**Rotherham.**—SCHOOL.—The Rotherham Education Committee invite tenders for school. See advertisement in this issue for further particulars.

APRIL 14.—**Swatragh.**—CHURCH WORKS.—Tenders are invited for the renovation and extension of St. John's Catholic Church, Swatragh, Derry, for the Right Rev. Monsignor M'Gurk, P.P., V.G. Plans, etc., may be obtained at the Parochial House, Maghera, or at offices of Mr. J. V. Brennan, C.E., architect, Belfast Bank-chambers, Belfast.

APRIL 14.—**Ynysybwl.**—CHURCH AND HALL.—Church and hall to be erected at Ynysybwl for the Vicar of Llanwonno. Names, accompanied by a deposit of 1*l.* 1s., to the architect, Mr. T. E. Richards, A.R.I.B.A., Pontypridd.

APRIL 16. — **Easington Lane.** — PREMISES.—For alterations and extensions of premises for Co-operative Society, Ltd., Easington Lane. The plans, etc., prepared by Mr. L. G. Ekins, of Newcastle-on-Tyne, architect, can be seen at the Society's Office, 1, Store-terrace, Easington Lane.

✱ APRIL 17.—**Bishopwearmouth.**—CHURCH.—The Building Committee of St. Gabriel's Church, Bishopwearmouth, invite tenders for new church. See advertisement in this issue for further particulars.

APRIL 17.—**Bury.**—COTTAGES.—The Corporation of Bury invite tenders for the erection of fifty cottages (five pairs each of five types), Bolton-road, Bury. Drawings may be seen, and specifications, etc., obtained, on application to Mr. Arthur M. Bradley, A.M.Inst.C.E., Borough Engineer and Surveyor, Bank-street, Bury, on payment of a deposit of 2*l.*

APRIL 17.—**Dudley.**—SCHOOL.—Staffordshire County and Dudley County Borough Councils invite tenders for the erection and completion of a new High School for Girls (accommodation, about 350 places) at Dudley. Apply to Mr. J. Hutchings, Architect and Surveyor, County Education Offices, Stafford. Quantities will be supplied upon receipt of a deposit of 3*l.* 3s.

APRIL 17.—**St. Erme, Cornwall.**—STABLE, ETC.—Reconstruction of a stable and harness-room, etc., at St. Erme Rectory. Plans, etc., will be received by Mr. H. Tresawna, St. Austell, or the Rev. J. O. Gunning, St. Erme Rectory.

✱ APRIL 19.—**Stevenage.**—SCHOOL.—The Hertfordshire C.C. Education Committee invite tenders for new County Council school at Stevenage. See advertisement in this issue for further particulars.

✱ APRIL 22.—**Greenwich.**—DEPOT BUILDINGS.—The Greenwich B.C. invite tenders for the erection of depôt buildings. See advertisement in this issue for further particulars.

✱ APRIL 24. — **Radcliffe.** — COUNCIL OFFICES. — The Radcliffe U.D.C. invite tenders for new Council Offices. See advertisement in this issue for further particulars.

✱ APRIL 26.—**Surbiton.**—EXTENSIONS.—The Surbiton U.D.C. invite tenders for extensions to Electricity Works in Ewell-road. See advertisement in this issue for further particulars.

✱ APRIL 28. — **Abergavenny.** — RECONSTRUCTION.—The Committee of Visitors, Monmouthshire Asylum, Abergavenny, invite tenders for reconstruction of the upper floors with fireproof staircases, new bath-houses, etc., at the Asylum, Abergavenny. See advertisement in this issue for further particulars.

✱ APRIL 29.—**Canterbury.**—RECREATION ROOMS.—The Kent County Asylums Committee invite tenders for new recreation rooms, etc., at Asylum, Chartham Downs, near Canterbury. See advertisement in this issue for further particulars.

NO DATE.—**Aston Manor.**—SCHOOL WORKS.—Aston Manor Education Committee invite tenders for alterations for, and for outside staircases at, Albert-road, Alma-street, Upper Thomas-street, and Vicarage-road Council Schools, Aston Manor. Quantities and form of tender to be obtained on application to the architect, Mr. J. W. Meredith, 153, Frederick-road, Aston Manor, on payment of 2*l.* 2s., payable to the Clerk of the Committee, Mr. H. Norwood.

NO DATE. — **Birstall.** — MASONRY TANKS.—For the construction of two masonry tanks at Birstall, either for labour only or complete, except for the stone. For plans and particulars apply Messrs. H. B. Watson, Ltd., Robert Town, Liversedge.

## ENGINEERING, IRON, AND STEEL.

APRIL 5.—**Burton-upon-Trent.**—EXCAVATION AND FOUNDATIONS FOR STEEL TANK.—The Corporation of Burton-upon-Trent invite tenders for the necessary excavations and foundations for new steel gas holder tank to be erected at their Gas Works, Wetmore-road, Burton-upon-Trent. Full particulars, etc., may be obtained on application to Mr R. S. Ramsden, Gas Works, Burton-upon-Trent, on payment of 1*l.* 1s.

APRIL 5.—**Crowd Hill.**—BRIDGE WORKS.—Southampton C.C. invite tenders for the widening and strengthening of a small brick bridge at Crowd Hill, near Colden Common. Copies of plan, etc., can be obtained on application at the office of Mr. W. J. Taylor, County Surveyor, The Castle, Winchester. A deposit of 2*l.* 2s. will be required for a copy of the plan and specification. Deposits must be made by cheque, payable to the Hants C.C., and crossed "Bank of England."

APRIL 5.—**Lockerby.**—BRIDGE WORKS.—Southampton C.C. invite tenders for the erection of two small brick bridges at Lockerley, near Romsey. Plan, etc., on application at the office of Mr. W. J. Taylor, County Surveyor, The Castle, Winchester. A deposit of 2*l.* 2s. will be required for a copy of the plan and specification. Deposits must be made by cheque, payable to the Hants C.C., and crossed "Bank of England."

APRIL 6. — **Haslingden.**—VENTILATING, ETC.—The Guardians invite tenders for:—(1) Ventilating appliances; (2) warm air stoves, in connexion with their new Infirmary now in course of erection. Architect, Mr. Henry Ross, Cannon-street, Accrington. All particulars may be had on application to Mr. J. H. Sinkinson, Clerk to the Guardians, Union Offices, Rawtenstall.

APRIL 8. — **Burry Port.**—BOREHOLE.—The U.D.C. invite tenders for the sinking and the testing of the yield of a borehole at Burry Port, Carmarthenshire. Copies of the specification, etc., can be obtained from the engineers, Messrs. Tulloch & Weaver, Northgate-mansions, Gloucester, on payment of 3*l.* 3s.

APRIL 8.—**Halifax.**—BOILERS, ETC.—Tenders are required for the removal of four 30 ft. by 8 ft. steam boilers and economisers, also forming seats and resetting of same, flues forming, etc., at Atlas Works, Halifax, for Messrs. Balme & Pritchard. Plans, etc., will lay for inspection, and quantities may be obtained, at offices of Messrs. Chas. F. L. Horsfall & Son, architects, Lord-street-chambers, Halifax.

APRIL 13. — **Milton Regis.** — PURIFIER.—Milton Regis U.D.C. invite tenders for the erection of a concrete purifier, and the extension of sulphate plant house at the Gas Works, Milton Regis. Plans etc., may be seen upon application to the Manager, Gas Works.

✱ APRIL 14.—**Stoke-upon-Trent.**—HOT-WATER SERVICE.—The Guardians of the Stoke-on-Trent Union invite tenders for erection of water softener and hot-water service at Workhouse. See advertisement in this issue for further particulars.

APRIL 17.—**Braintree.**—NEW STEEL TANK.—The U.D.C. invite tenders for the delivery and erection of a new square stamped steel tank in the Tank Yard, Braintree, Essex. Copies of the drawings, etc., can be obtained from the Engineer, Mr. Percy Griffith, M.Inst.C.E., F.G.S., 54, Parliament-street, Westminster, S.W., on payment of 2*l.*

NO DATE. — **Warley.** — HEATING APPARATUS.—The Oldbury U.D. Education Committee are prepared to receive the names of persons desirous of submitting tenders for the supply of heating apparatus for new Council Schools, accommodating about 1,000 children, at Abbey-road, Warley. Mr. Sydney Vernon, Secretary, Public Buildings, Oldbury.

## MISCELLANEOUS.

APRIL 5. — **Cheriton.** — SCAVENGING. — Cheriton U.D.C. invite tenders for the collection and removal of all house and other refuse, dust, and ashes from the houses and the portion of Shorncliffe Camp. Particulars can be seen at the Public Offices, Cheriton.

APRIL 5.—**Rochford.**—CARTING.—Rochford R.D.C. invite tenders for the supply of horses, carts, and men for work on the highways. Mr. Frederic Gregson, Clerk, Southend-on-Sea.

APRIL 5.—**Salford.**—MOTOR FIRE-ENGINE.—Tenders are invited for the supply of a combined petrol motor fire-engine, escape, and hose tender complete. Full particulars may be obtained on application to the Chief Officer, Central Fire-station, The Crescent, Salford.

APRIL 6.—**Deeside District of Aberdeenshire.**—QUARRYING.—Offers wanted for quarrying and breaking stones for road repairs. Particulars, etc., may be had from Mr. A. H. Clayton, Road Surveyor, Aboyne.

APRIL 6.—**Felixstowe and Walton.**—SEATS.—The U.D.C. invite tenders for the supply of about 250 seats for their new spa building at the Hamilton-terrace Cliffs. Full particulars may be had on application to the Surveyor, Town Hall, Felixstowe.

APRIL 7.—**Cranbrook (Kent).**—MATERIALS.—Cranbrook R.D.C. invite tenders for the supply of road materials. Forms of tender, etc., may be obtained of Mr. T. H. Crampton, Clerk, Cranbrook, Kent.

APRIL 10.—**Aylesbury.**—CARTING.—Tenders are invited for carting granite and slag and for horse, cart, and man for carting water. Full particulars can be obtained of the District Surveyor, Bourbon-street, Aylesbury.

APRIL 10. — **Barry.** — STEAM ROAD ROLLER.—Barry U.D.C. invite tenders for the supply of a compound steam road roller, complete with scarifier. Mr. T. B. Tordoff, Clerk to the Council, Public Offices, Barry, Glam.

APRIL 13. — **Southampton.**—REMOVING SLUDGE.—The Corporation invite alternative tenders for the removal of sewage sludge. Conditions, etc., may be obtained upon application to Mr. J. A. Crowther, Borough Engineer.

✱ APRIL 17.—**Fulham.**—FURNITURE AND FITTINGS.—The Fulham B.C. invite tenders for furniture and fittings to new Central Library. See advertisement in this issue for further particulars.

✱ APRIL 29. — **Kensington.**—EXTERNAL REPAIRS.—The Kensington Guardians invite tenders for external repairs to the Workhouse. See advertisement in this issue for further particulars.

## PAINTING, etc.

✱ APRIL 6. — **Neasden.** — PAINTING, ETC. — The Willesden D.C. invite tenders for cleansing and painting works at Isolation Hospital, Dog-lane, Neasden. See advertisement in this issue for further particulars.

APRIL 6.—**Sunderland.**—PAINTING.—The Corporation of Sunderland invite tenders for the painting, etc., at Bishopwearmouth Cemetery. Specifications may be seen, and form of tender obtained, at the Borough Surveyor's Office, Town Hall.

APRIL 7.—**Leeds.**—PAINTING.—Tenders are invited for painting a portion of the public lamps during the ensuing year. Specification, etc., may be obtained from the Superintendent, Street Lighting Department, Springwell-street.

APRIL 8 — **Barnstaple.** — COLOURING, ETC. — The Guardians of the Barnstaple Union invite tenders for:—(1) Whitewashing and colouring the exterior of the Union Workhouse, (2) whitewashing and colouring the exterior and interior of the Guardians' Cottage Homes. Further particulars may be obtained on application to the Master of the Union Workhouse.

✱ APRIL 14.—**Dartford.**—PAINTING, ETC.—The Metropolitan Asylums Board invite tenders for cleaning and painting works and repairs at Darenth Asylum, Dartford, Kent. See advertisement in this issue for further particulars.

✱ APRIL 14.—**Fulham.**—PAINTING, ETC.—The Guardians of St. George's Union invite tenders for painting, distempering, general repairs, etc., at the Infirmary, Fulham-road, S.W. See advertisement in this issue for further particulars.

NO DATE.—**Scotswood.**—PAINTING, ETC.—Newcastle-upon-Tyne Education Committee invite tenders for the cleaning and painting of the School premises recently vacated at Scotswood. For full particulars send stamped addressed foolscap envelope to the Secretary, Education Offices, Northumberland-road, Newcastle-upon-Tyne.

## ROADS, SANITARY, AND WATER WORKS.

APRIL 5. — **Bermondsey.** — SEWER WORK. — The B.C. invite tenders for the removal of a disused sewer and repaving of the carriageway in Grange-road. Plans, etc., may be seen, and forms of tender obtained, on application to Mr. R. J. Angel, M.Inst.C.E., Borough Surveyor.

APRIL 6.—**Handsworth.**—ROADWORK.—The U.D.C. of Handsworth invite tenders for making Barn-lane. All particulars may be obtained on application to Mr. H. Richardson, A.M.Inst.C.E., Surveyor to the Council.

✱ APRIL 6. — **Kilburn.** — ASPHALT PAVING. — The Willesden D.C. invite tenders for about 6,500 super. yds. of natural rock asphalt in Kilburn-lane and Banister-road, Kilburn, N.W. See advertisement in this issue for further particulars.

APRIL 6. — **Weston and Twerton.** — STREET WORKS.—The R.D.C. of Bath invite tenders for making-up Evelyn-road, in the Parish of Weston, and Sladebrook-avenue, in the Parish of Twerton. Plans, etc., may be seen, and forms of tender, etc., obtained, on application to Mr. E. H. Sheppard, the Council's Surveyor, at 3, North-parade, Bath. Each contractor will be required to deposit a cheque for 2*l.* 2s.

APRIL 7.—**Bedford.**—PAVING.—Paving and road-making in Honey Hill-road, Bedford. Plans, etc., may be seen, and any other information obtained, at the Borough Surveyor's office, Town Hall, Bedford.

APRIL 7. — **Macclesfield.**—SEWERS.—The Corporation invite tenders for the construction of sewers in the Buxton Old-road and Blakelow-road. Plans, etc., can be seen at the office of Mr. Chas. W. Stubbs, Borough Engineer, and specifications, etc., obtained, upon the deposit of 1*l.*

APRIL 7.—**Rathdown.**—STEPASIDE WATER SUPPLY.—Rathdown No. 1 R.D.C. invite tenders for putting in of water supply to the Village of Stepaside. Plans and specification, prepared by Mr. P. H. M'Carthy, M.A.B.E., M.Inst.C.E., 39, Westmoreland-street, Dublin, can be seen at the Clerk's office, Loughlinstown.

APRIL 7. — **South Dublin.** — ROADMAKING. — The R.D.C. invite tenders for roadmaking and other works at Templeogue (site 191 Terenure) in connexion with labourers' cottages. Plan, etc., may be seen at the office of the District Council. Mr. T. J. Byrne, A.R.I.B.A., Clerk and Surveyor to the District Council, 1, James's-street, Dublin.

APRIL 8.—**Liskeard.**—SEWER.—Liskeard R.D.C. invite tenders for laying about 730 ft. of new 9-in. stoneware pipe sewer, near Doublebois Station. Tenders to be sent to Mr. A. de Castro Glubb, solicitor, Liskeard.

APRIL 8.—**Leven.**—DRAIN.—Tenders are wanted for the construction of a drain from Scoonie Myre to Silverburn, Leven, Fife, for Mr. R. M. Christie, of Durie. Plans may be seen, and copies of the specifications, etc., obtained, at the office of Mr. Alexr. C. Dewar, architect, Leven, Fife, on payment of 10s.

APRIL 8.—**Morley.**—PRIVATE STREET IMPROVEMENT WORKS.—The Highways Committee invite tenders for the paving and flagging of portions of Worrall-street and Scatcherd-lane. The general conditions of contract, etc., may be inspected, and copies of the bill of quantities and forms of tender obtained, on application to Mr. W. E. Putman, A.M.Inst.C.E., Borough Engineer and Surveyor, Town Hall, Morley.

APRIL 8. — **Southend-on-Sea.** — MAKING-UP.—The Corporation invite tenders for the making-up of street and parts of streets. Plans, etc., may be seen, and bills of quantities, etc., obtained (on deposit of cheque for 1*l.* 1s. in respect of each street), upon application to Mr. E. J. Elford, M.Inst.M.E., Borough Surveyor.

APRIL 8. — **South Kirkby.**—ROADS.—Construction of roads at South Kirkby Collieries, near Wakefield. Plans, etc., at the Pontefract office of the surveyors, Messrs. Garside & Pennington, surveyors, etc., Pontefract and Castleford.

APRIL 8. — **Withington and Chorlton, etc.** — ROAD WORKS.—Manchester Corporation (Withington Committee) invite tenders for the several works required in the sewering, draining, kerbing, flagging, and sett paving. Plans, etc., can be seen, and a form of tender, etc., obtained, from the Surveyor to the Committee, Town Hall, West Didsbury.

APRIL 10.—**Leeds.**—ROAD WORKS.—The Highways Committee Committee invite tenders for the paving and flagging of private streets. Drawings of the private streets may be seen at the City Engineer's office, Municipal Buildings. Forms of tender, etc., may be obtained, and copies of the documents forming the contract inspected, on application at the Highways Office, 155, Kirkstall-road.

APRIL 12.—**Gelligaer.**—ROAD.—Forming and metalling of a new road at Gelligaer Village for Messrs. D. Williams & Co., Taff Vale Brewery, Merthyr Tydfil. Plans, etc., may be seen at office of Mr. Wm. Harris, architect and surveyor, Bank-chambers, Bargoed. Bill of quantities supplied upon deposit of 10s. 6d.

APRIL 12.—**Great Harwood.**—SEWER.—Great Harwood U.D.C. invite tenders for labour required in the laying of about 1,400 yds. of pipe sewers, together with manholes, etc. Plans may be seen, and specifications, etc., obtained, on application to Mr. A. H. Dunkin, Surveyor to the Council.

APRIL 12. — **Killough.** — SANITARY WORKS. — The Local Board of Charles Sheils' Institution, Killough, County Down, invite tenders for sanitary works, etc. Plans, etc., can be seen at office of Messrs. Young & Mackenzie, Scottish Provident Buildings, and with Mr. George M. Swail, the Superintendent, at Killough.

APRIL 13.—**Rogerstone.**—SEWERAGE.—St. Mellon's R.D.C., Monmouthshire, invite tenders for the sewerage of the Rogerstone Drainage Area. Drawings, etc., may be seen at the offices of Mr. Ithel Thomas, Clerk, Union Offices, Queen's-hill, Newport, Mon., from whom bills of quantities, etc., may be obtained upon payment of a deposit of 5*l.*

✱ APRIL 14.—**Carshalton.**—TAR PAVING.—The Carshalton U.D.C. invite tenders for laying limestone tar paving, relaying and providing kerbing, etc. at North-street, Waterloo-road, and The Beeches

See advertisement in this issue for further particulars.

APRIL 14.—**Hampstead.**—WOOD PAVING.—The B.C. invite tenders for paving with creosoted deal a portion of Constantine and Agincourt roads. Specification can be seen on application to Mr. O. E. Winter, A.M.Inst.C.E., at the Town Hall, where form of tender, etc., can be obtained.

APRIL 16.—**Preston.**—ROAD WORKS.—The Corporation invite tenders for the works required in levelling, paving, flagging, etc., and making good Cliff-street. Plan, etc., may be seen, and schedules of quantities, etc., obtained, at the office of the Borough Surveyor, Town Hall, Preston.

APRIL 17.—**Linlithgow.**—UPHALL AND BROXBURN DRAINAGE.—The Bathgate District Committee invite tenders for the construction of about five miles of 6-in. to 18-in. sewers and relative works. Plans may be seen and copies of the specification, etc., obtained, at the office of Messrs. Middleton, Hunter, & Duff, M.M.Inst.C.E., 42, Frederick-street, Edinburgh, on payment of 1*l*. An assistant engineer will meet intending offerers at Uphall Station at 9.18 a.m. on April 5 to point out the lines of the work.

APRIL 17.—**Lytham.**—SEWERAGE AND SEWER OUTFALL WORKS.—The U.D.C. invite tenders for these works (two contracts). Plans may be seen, and specifications, etc., obtained, at the office of the Engineer, Mr. A. J. Price, Council Offices, Lytham, on payment by cheque of the sum of 2*l*. 2s.

APRIL 19. — **Eastham, Wirral.** — SEWERS.—The R.D.C. invite tenders for the construction of sewers and appurtenant works in Church-lane and Stanley-road, in the township of Eastham. The drawings, etc., may be seen, at the office of the engineers, Messrs. Priest & Ellis, M.Inst.C.E., 13, Harrington-street, Liverpool, from whom copies of the specification, etc., may be obtained on deposit of 1*l*. 1s.

* APRIL 19.—**Hendon.**—ROADMAKING, ETC.—The Hendon U.D.C. invite tenders for kerbing and paving Edgware-road, The Hyde, and construction of bacteria beds Nos. 6, 7, and 8, sewage outfall works. See advertisement in this issue for further particulars.

APRIL 19.—**Walton-upon-Thames.**—SEWERS.—The U.D.C. invite tenders for the construction of surface-water sewers. The drawings, etc., may be seen, and bills of quantities obtained, on application to Mr. R. Wilds, Surveyor to the Council, Council Offices, Walton-on-Thames, and the payment of a deposit of 2*l*.

* APRIL 23.—**Winchmore Hill, N.**—TAR PAVING, ETC.—The Metropolitan Asylums Board invite tenders for road repairing and tar paving work, etc., at the Northern (Convalescent) Fever Hospital, Winchmore Hill, N. See advertisement in this issue for further particulars.

APRIL 24.—**Portrush.**—WATER EXTENSION.—The Portrush U.D.C. invite tenders for the extension of the Portrush Waterworks. Plans, etc., may be seen, and a copy of the specification, etc., can be obtained upon payment of 1*l*. 1s. (which will not be returned), at the office of the engineers, Messrs. Swiney & Croasdaile, MM.Inst.C.E., Avenue-chambers, Belfast.

APRIL 24.—**Rothbury.**—SEWERAGE AND SEWAGE DISPOSAL WORKS.—The U.D.C. invite tenders for the construction of about 4,100 lin. yds. of 9-in. and 6-in. earthenware and cast-iron pipe sewers, etc. Plans, etc., may be seen, and bills of quantities, etc., obtained, on application to Mr. C. Franklin Murphy, A.M.Inst.C.E., civil engineer, Newgate-street, Morpeth, on payment of a deposit of 5*l*.

APRIL 26-MAY 8.—**Christchurch.**—MAIN DRAINAGE, CONTRACT No. 1.—Tenders for the carrying out of a main drainage scheme, comprising about eight and three-quarter miles of stoneware pipe sewers, etc. Drawings may be inspected, and copies of the general conditions, etc., may be obtained, on payment of 5*l*. 5s., at the office of the engineer, Mr. C. J. Lomax, A.M.Inst.C.E., 37, Cross-street, Manchester, and 28, Victoria-street, Westminster. Also drawings may be inspected and copies of the general conditions, etc., obtained at the Town Hall, Christchurch.

APRIL 26.—**Exmouth.**—TAR MACADAM.—Exmouth U.D.C. invite tenders for the necessary works in making-up three back roads in tar macadam on The Marsh. Bill of quantities can be obtained, and specification, etc., can be seen, at the Surveyor's office, Public Hall, Exmouth.

MAY 3.—**Dawlish.**—SEWERS.—Dawlish U.D.C. invite tenders for the laying of about two and a half miles of stoneware pipe sewers, etc. Drawings may be seen, and conditions, etc., obtained, at the office of the engineer and surveyor, Mr. S. F. C. Churchward, Dawlish, on payment of a deposit of 3*l*. 3s.

NO DATE.—**Glen Dye.**—ROADS, ETC.—Construction of about three and a half miles of carriage roads, with bridges, etc., in Glen Dye, Kincardineshire. Intending offerers are requested to communicate with the engineer, Mr. Manners, 12, Lombard-street, Inverness.

## STONES, MATERIAL, AND STORES.

APRIL 5.—**Petersfield.**—TAR.—Petersfield U.D.C. invite tenders for the supply of refined coal tar for tar painting roads. Mr. H. T. Keates, Town Surveyor, Petersfield.

APRIL 5.—**Teddington.**—ANNUAL CONTRACTS.—Teddington U.D.C. invite tenders for materials, stores, etc. Particulars, etc., may be obtained on application to Mr. Marshall Hainsworth, Surveyor, Council Offices, Teddington.

APRIL 5.—**Wolverhampton.**—ANNUAL CONTRACTS FOR STORES.—Tenders are invited for the supply of Portland cement, macadam, broken slag, etc. Specifications and forms of tender may be obtained on application at the office of Mr. George Green, Borough Engineer, Town Hall, Wolverhampton.

APRIL 5.—**Ystradfellte.**—NEATH VALLEY, MAIN PIPE CONDUIT, CONTRACTS 3, 4, 5, AND 6 (CAST-IRON PIPES, SPECIAL CASTINGS, VALVES, ETC.).—The Waterworks Committee of Neath R.D.C. invite tenders for the supply of cast-iron pipes of 19 in. and 15 in. in diameter respectively. Detail drawings may be seen, and copies of the specification, etc., may be obtained, upon application to Mr. D. M. Davies, Engineer, Council Offices, Neath, upon receipt of the sum of 3*l*. 3s.

APRIL 6.—**Castle Ward.**—KERB.—The R.D.C. of Castle Ward invite tenders for the supply and delivery of about 1,200 yds. of 12 in. by 6 in. flat pick-dressed freestone kerb. Mr. George Wilkinson, Clerk to the Council, 1, Mosley-street, Newcastle-upon-Tyne.

APRIL 6.—**Glasgow.**—MATERIALS.—The Corporation invite tenders for the supply of materials, etc. Specifications, etc., may be had on application to Mr. D. M'Coll, Superintendent of Cleansing, 38, Cochrane-street, Glasgow.

APRIL 6.—**Hebburn.**—MATERIALS.—Hebburn U.D.C. invite tenders for materials. Forms of tender, etc., will be supplied on application to the Surveyor at the Council Offices, Hebburn.

APRIL 7.—**St. Austell.**—DRAIN PIPES.—The R.D.C. invite tenders for the supply of socket drain pipes. Further particulars can be obtained of Mr. A. J. Blight, Highway Surveyor, Trelowth, St. Austell.

APRIL 8.—**Morley.**—ANNUAL TENDERS.—The Highways Committee invite tenders for the supply of materials during the year. Forms of tender, etc., may be obtained on application to Mr. W. E. Putman, A.M.Inst.C.E., Borough Engineer and Surveyor, Town Hall, Morley.

APRIL 10.—**Aylesbury.**—MATERIALS.—Aylesbury R.D.C. invite tenders for 2,245 cubic yds. of flints, 1,935 tons of granite, and 1,080 tons of slag, for the repair of the roads. Full particulars and forms of tender may be obtained from the District Surveyor, Mr. W. J. Cook, Aylesbury.

APRIL 10.—**Bury St. Edmund's.**—GRANITE.—West Suffolk C.C. invite tenders for the supply of granite during the year. Forms can be obtained on application to Mr. A. Ainsworth Hunt, County Surveyor, Shire Hall, Bury St. Edmund's.

APRIL 10.—**Leith.**—TIMBER, IRON, AND STORES.—The Commissioners for the Harbour and Docks of Leith invite tenders for the supply of timber, iron, and stores. Particulars may be obtained on application at the office of the Superintendent, Tower-place, Leith.

APRIL 10.—**Tamworth.**—GRANITE.—The Corporation invite tenders for the supply of broken granite for the year. Mr. F. E. G. Bradshaw, Borough Surveyor, Municipal Offices, Tamworth.

APRIL 12.—**Glasgow.**—STORES, ETC.—The Corporation invite tenders for supplying furnishings, etc., and executing the works required for the Lighting Department for twelve months. Specifications, etc., may be had on application at the office of the Lighting Department, 52, College-street.

APRIL 13.—**Chorley.**—MATERIALS.—Chorley R.D.C. invite tenders for materials. Further particulars, etc., may be obtained from Mr. Percy Whalley, Highway Surveyor Gregson-lane, Hoghton, near Preston.

APRIL 13.—**Southampton.**—STORES, ETC.—The Corporation invite tenders for the supply of stores, etc., required in the Borough Engineer's Department. Specification, etc., may be obtained at the Borough Engineer's office.

APRIL 14.—**Tynemouth.**—WHINSTONE KERB.—Tynemouth R.D.C. invite tenders for supply of whinstone kerb. Specification, etc., may be obtained on application to Mr. John Waters, District Surveyor, Long Benton, Newcastle-on-Tyne.

APRIL 15.—**Houghton-le-Spring.**—MATERIALS.—The R.D.C. of Houghton-le-Spring invite tenders for supplying machine-broken blastfurnace slag road metal, slag riddlings, and blue limestone for asphalting. Full particulars, with forms of tender, may be obtained from the Surveyor of the Council, Mr. D. Balfour, M.Inst.C.E., Houghton-le-Spring, S.O.

APRIL 16.—**Southport.**—MATERIALS.—The Highway and Sewerage Committee invite tenders for the supply of materials. Specifications, etc., may be obtained on application to the Borough Surveyor, Town Hall, Southport.

APRIL 17.—**Goole.**—STOVE, ETC.—The R.D.C. of Goole invite tenders for the supply of stone, ashes, and asphalt. Forms of tender can be obtained on application to Mr. Geo. England, Clerk to the Council, Bank-chambers, Goole.

APRIL 20.—**Alton.**—MATERIALS.—Alton R.D.C. invite tenders for the supply of materials and steam rolling. Specifications, etc., can be obtained from the surveyor, Mr. Wm. McIntosh, Alton, Hants, on receipt of a stamped and addressed envelope.

APRIL 22.—**Barry.**—ANNUAL CONTRACTS.—Barry U.D.C. invite tenders for the supply of lead and compo pipe, pig and sheet lead, block tin, etc., for alternative periods of six and twelve months. Further particulars and forms of tender may be obtained from Mr. T. E. Franklin, Engineer and Manager, Gas Works, Barry, where samples may be inspected.

APRIL 22.—**Gloucester.**—STONE, ETC.—Gloucester R.D.C. invite tenders for stone and hauling. Forms of tender may be obtained at the offices of the Council, Berkeley House, Berkeley-street, Gloucester, from Mr. F. E. Weaver, the District Surveyor.

APRIL 26.—**Tenterden.**—MATERIALS.—Tenterden R.D.C. invite tenders for supplying and delivering materials. Further particulars, etc., may be obtained of Mr. W. L. C. Turner, District Surveyor, Tenterden.

# Public Appointment.

| Nature of Appointment. | By whom Advertised. | Salary. | Application to be in |
|---|---|---|---|
| *DRAUGHTSMAN (BRD. OF AGRICULTURE & FISHERIES) | Civil Service Commission..... | Not stated ..... | April 15 |

# Auction Sales.

| Nature and Place of Sale. | By whom Offered. | Date of Sale. |
|---|---|---|
| *DEALS, BATTENS, ETC., Great Hall, Winchester House, Old Broad-street, E.C. ..... | Churchill & Sim ..... | April 7 |
| *FREEHOLD FACTORIES, CROYDON—On the Premises ..... | Fuller, Horsey, Sons, & Cassell ..... | April 19 |
| *WOODWORKING PLANT AND MACHINERY, CROYDON—On the Premises ..... | Fuller, Horsey, Sons, & Cassell ..... | do. |
| *BLDR. AND CONTRACTOR'S STOCK, PLANT, ETC., WALTHAMSTOW—On the Premises | Mark Lidell & Son ..... | April 21 |
| *FREEHOLD BUILDING LAND, NORTH FINCHLEY—Torrington Hotel, North Finchley... | Charles Sparrow & Son ..... | April 26 |
| *STEEL WORKS, PLANT AND MACHINERY, FULHAM—At the Mart ..... | Fuller, Horsey, Sons, & Cassell ..... | April 28 |
| *FREEHOLD BUILDING LAND, TOOTING—Castle Hotel, Tooting ..... | Eastman Bros. ..... | do. |
| *FREEHOLD BUILDING SITE, CHANCERY-LANE—At the Mart ..... | Debenham, Tewson, Richardson, & Co. ..... | May 11 |
| *BUILDING SITE, CHEAPSIDE—At the Mart ..... ..... | Farebrother, Ellis, Egerton, Breach, Galsworthy, & Co. ... | May 18 |
| *FREEHOLD SITES, BEDFORD ROW, ETC.—At the Mart ..... | Jones, Lang, & Co. ..... | May |
| *BUILDING SITE, MONKWELL-STREET, E.C.—At the Mart ..... | Jones, Lang, & Co. ..... | do. |

## SOME RECENT SALES OF PROPERTY:

### ESTATE EXCHANGE REPORT.

March 17.—By NEWLAND, DAVIS, & HUNT (at Newport).

| | |
|---|---|
| Nash, Mon.—Freehold pasture land, 20 a. 0 r. 39 p. ..... | £1,290 |
| Goldcliffe, Mon.—Two pieces of pasture land, 18 a. 2 r. 1 p., f. ..... | 960 |
| Llanhennock, Mon.—Two fields of pasture, 21 a. 2 r. 38 p., c. ..... | 1,010 |
| Christchurch, Mon.—Freehold pasture and building land, 1 a. 3 r. 9 p. ..... | 305 |

March 18.—By W. BROWN & CO. (at Boxmoor).

| | |
|---|---|
| Bovingdon, Herts.—Two closes of pasture land, 26 a. 1 r. 31 p., f. ..... | £1,210 |

By WM. DEW & SON (at Llangefni).

| | |
|---|---|
| Llangristiolus, Anglesey.—Fferam Farm, 153 a. 2 r. 2 p., f. ..... | 5,000 |

By BATCHELAR & SON (at Croydon).

| | |
|---|---|
| Croydon.—2, 3, and 4, Parker-rd., f., w.r. 63*l*. 14s. | 650 |
| 1, Whitgift-st.; 6 to 11, Wandle-rd., u.t. 45 yrs., g.r. 29*l*. 10s., w.r. 261*l*. 6s. ..... | 1,225 |
| Caterham.—Beechwood-rd., freehold building land, 1 a. 2 r. 8 p. ..... | 375 |

March 20.—By W. J. PEIRCE (at Northampton).

| | |
|---|---|
| Moulton, Northants.—Howes Farm, 124 a., f. (including timber) ..... | £3,958 |

March 22.—By BUCKLAND & SONS.

| | |
|---|---|
| Leyton.—7, Cambrian-rd., f., e.r. 32*l*. 10s. ..... | 235 |

By WALTER HALL & SONS.

| | |
|---|---|
| Hendon.—17 to 29 (odd), Pollard-rd.; 10, 12, and 14, Milton-rd.; 26, 30, and 32, Telford-rd., u.t. 72 yrs., g.r. 75*l*., w.r. 405*l*. 12s. ..... | 1,650 |
| Hampstead.—1, Maitland Park-villas, u.t. 42¼ yrs., g.r. 11*l*. 8s., e.r. 60*l*. ..... | 450 |

By E. HUGH HENRY.
Kennington.—4, De Laune-street, u.t. 55¼ yrs., g.r. 6*l.*, e.r. 58*l.* ..... £350

March 23.—By C. RAWLEY CROSS & Co.
Shepherd's Bush.—454, Uxbridge-rd., u.t. 65¼ yrs., g.r. 25*l.*, p. ..... 525

By LESLIE, MARSH, & Co.
West Kensington.—6, Gledstanes-rd., u.t. 73 yrs., g.r. 12*l.* e.r. 80*l.* ..... 450
6, Sinclair-rd., u.t. 66 yrs., g.r. 15*l.*, y.r. 70*l.* 450
Brixton.—5 and 7, Santley-st., u.t. 66 yrs., g.r. 13*l.* 10s., y. and e.r. 74*l.* ..... 535

By ORGILL, MARES, & BARLEY.
Canning Town.—Barking-rd., Bridge House Hotel, free lease for 48 yrs., at 150*l.*, with good will and possession ..... 11,700

By A. R. PEACEY.
Camden Town.—Arlington-rd., f.g.r. 8*l.* 8s., reversion in 10 yrs. ..... 1,220

By GEORGE LOVEITT & SONS (at Coventry).
Wolston, Warwick.—Dunsmore-rd., freehold house ..... 325
Coventry, Warwick.—1, 3, and 5, Peel-st., f., gross rental 45*l.* 10s. ..... 550
14, Clifton-st., f. ..... 160
87 to 93, 97 to 103 (odd), Gulson-rd., u.t. 92 yrs., g.r. 15*l.*, gross rental 153*l.* 8s. ..... 1,460

March 24.—By ANTCLIFFS'.
Leytonstone.—24, Old Fillebrook-rd., f., e.r. 42*l.* 585
Fillebrook-rd., l.g.r. 7*l.* ..... 152

By FISHER, STANHOPE, & Co.
Peckham.—2d, Kelmore-gr., u.t. 67 yrs., g.r. 7*l.* 10s., e.r. 38*l.* ..... 295
Clapton.—69, London-rd., u.t. 50 yrs., g.r. 5*l.*, y.r. 32*l.* ..... 240

By FURBERS'.
Peckham.—Glengall-rd., Edisonia Manufacturing Premises, area 25,544 ft., f. and part u.t. 7¼ yrs., g.r. 20*l.*, with plant, machinery, stock, goodwill, etc. (as a going concern)... 10,400

By SAMUEL WOOLRAUCH.
Clapham.—41, 43, and 45, Union-gr., u.t. 17 yrs., g.r. 15*l.*, y.r. 102*l.* (subject to an annuity of 10*l.*, life aged 66) ..... 405
Croydon.—38 to 48 (even), Wentworth-rd., u.t. 88 yrs., g.r. 24*l.*, w.r. 137*l.* 16s. ..... 270
Hackney.—111, Amhurst-rd., u.t. 58¼ yrs., g.r. 7*l.*, e.r. 50*l.* ..... 265
Manor Park.—12 to 18 (even), Lawrence-av., u.t. 89 yrs., g.r. 20*l.*, w.r. 96*l.* 17s. ..... 225
Isleworth.—3 to 10, Oak-ter., u.t. 89 yrs., g.r. 42*l.*, w.r. 204*l.* 2s. ..... 225

By A. BURTENSHAW & SON (at Hailsham).
Warbleton, Sussex.—Bodle-st., seven freehold cottages, gross rents 48*l.* 14s. ..... 612

By WILLIAM WESTON (at Harrow-road).
Paddington.—101, Fernhead-rd., u.t. 71 yrs., g.r. 9*l.*, w.r. 98*l.* 16s. ..... 440
28, Woodchester-st., u.t. 43 yrs., g.r. 5*l.*, w.r. 62*l.* 8s. ..... 150
70 and 72, Clarendon-st., u.t. 43 yrs., g.r. 11*l.*, w.r. 120*l.* ..... 300
55, Westbourne Park-cres., u.t. 50 yrs., g.r. 8*l.*, p. ..... 300

By DOLMAN & PEARCE (at Pinner).
Pinner.—The Chase, "Harrow View," u.t. 90 yrs., g.r. 8*l.* 8s., y.r. 55*l.* ..... 655

March 25.—By CHAS. ATKINS.
Forest Hill.—Stanstead-rd., Railway Telegraph p-h., lease for 23 yrs. at 100*l.*, with goodwill and possession ..... 2,650

By CARR & GREEN.
Wood Green.—147, 149, 182, and 184, Albert-rd., u.t. 92 yrs., g.r. 18*l.* 8s., w.r. 127*l.* 4s. ..... 600

By JOHN G. DEAN & Co.
Balham.—78, Foxbourne-rd., u.t. 81 yrs., g.r. 6*l.* 10s., e.r. 40*l.* ..... 370

By DRYSDALE, NURSE, & Co.
Stoke Newington.—79, Northwold-rd., u.t. 84 yrs., g.r. 6*l.*, e.r. 40*l.* ..... 370
39, Bayston-rd., u.t. 66 yrs., g.r. 5*l.* 10s., e.r. 34*l.* ..... 305
Clapton.—34, Sach-rd., u.t. 74 yrs., g.r. 5*l.* 10s., e.r. 36*l.* ..... 250

By FAREBROTHER, ELLIS, & Co.
City.—12, Moorgate-st. (shop and offices), area 820 ft., f., y.r. 575*l.* ..... 16,500
Holborn.—23 and 24, Little Earl-st. (s.), area 1,600 ft., f., y.r. 150*l.* ..... 3,000

By HERRING, SON, & DAW.
Fulham.—34, Walham-gr., u.t. 51 yrs., g.r. 6*l.*, y.r. 36*l.* ..... 280

By NEWBON, SHEPHARD, & EDWARDS.
Highgate.—21, Chetwynd-rd., u.t. 65 yrs., g.r. 7*l.* 7s., e.r. 42*l.* ..... 280
215 and 217, Essex-rd., u.t. 9½ yrs., g.r. 7*l.* 16s., y.r. 100*l.* ..... 135
Holloway.—434, Liverpool-rd., u.t. 25 yrs., g.r. 7*l.*, e.r. 40*l.* ..... 155
21, Cardwell-rd., u.t. 57½ yrs., g.r. 7*l.*, y.r. 44*l.* 395
18, Huddleston-rd., u.t. 58 yrs., g.r. 7*l.*, y.r. 46*l.* ..... 440
Kentish Town.—30, Belmont-st., u.t. 54½ yrs., g.r. 6*l.* 10s., y.r. 38*l.* ..... 330
88, Belmont-st., u.t. 57 yrs., g.r. 6*l.* 10s., y.r. 42*l.* ..... 340

By PERCIVAL HODSON.
Holloway.—19, Brecknock-rd. (s.), u.t. 37½ yrs., g.r. 14*l.*, y.r. 56*l.* ..... 250

By STIMSON & SONS.
Brixton.—Nursery-rd., f.g. rents 7*l.*, reversion in 58 yrs. ..... 170
Shannon-gr., f.g. rents 12*l.*, reversion in 58 yrs. 320
Rotherhithe.—Albion, Temeraire, and Clack-st., also Swan-la., f.g. rents 145*l.* 6s. 6d., reversions, in 42 to 55 yrs. (in lots) ..... 3,870
75, 77, and 81, Albion-st., f., w.r. 81*l.* 18s. ..... 845
1 to 5, Gooch-pl., f., w.r. 84*l.* 10s. ..... 400
88, Albion-st. (shop and stabling), f., w.r. 41*l.* 4s. ..... 370
26 and 27, Hadland-st., f., w.r. 52*l.* ..... 675
42 and 44, Aylton-st., f., w.r. 30*l.* ..... 300

By JOSEPH STOWER.
Brockley.—Crofton Park-rd., f.g. rents 65*l.*, reversion in 88 and 95 yrs. ..... £1,560
Ewhurst-rd., f.g. rents 22*l.* 10s., reversion in 88 and 95 yrs. ..... 540
Stillness-rd., f.g.r. 6*l.*, reversion in 88 yrs.... 146

March 26.—By A. G. BONSOR.
Feltham, Middx.—Fruen-rd., Stonecroft, f., w.r. 18*l.* 4s. ..... 205

By MABBETT & EDGE.
Caledonian-road.—16, New Wharf-rd. (cottage, stabling, and timber-yard), f., y.r. 139*l.* 12s., also f.g.r. 10*l.* 8s., reversion in 37 yrs. ..... 2,710
Hackney.—Dagmar-rd., Dagmar Arms b.h., u.t. 29 yrs., g.r. 5*l.*, gross rental 36*l.* ..... 350
Blackfriars.—233 and 234, Blackfriars-rd. (s.), f., y.r. 228*l.* ..... 4,125

By MAPLE & Co.
Belgravia.—22, Eaton-pl., and 22, Eccleston-mews, u.t. 15 yrs., g.r. 5*l.*, p. (stabling underlet for next 2 yrs. at 5*l.* g.r.) ..... 1,970

*Contractions used in these lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; g.r. for grove; b.h. for beerhouse; p.h. for public-house; o. for offices; s. for shops; ct. for court.

## PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

### BRICKS, &c.

| | £ s. d. | |
|---|---|---|
| Best Stocks | 1 6 6 | per 1000 alongside, in river. |
| Picked Stocks for Facings | 2 10 0 | ,, delivered |
| Flettons | 1 4 6 | ,, at railway depôt. |
| Best Fareham Red | 3 12 0 | ,, ,, ,, |
| Best Red Pressed Ruabon Facing | 5 0 0 | ,, ,, ,, |
| Best Blue Pressed Staffordshire | 3 15 0 | ,, ,, ,, |
| Do. Bullnose | 4 0 0 | ,, ,, ,, |
| Best Stourbridge Fire Bricks | 3 14 0 | ,, ,, ,, |
| GLAZED BRICKS | | |
| Best White and Ivory Glazed Stretchers | 10 7 6 | ,, ,, ,, |
| Headers | 9 17 6 | ,, ,, ,, |
| Quoins, Bullnose, and Flats | 13 17 6 | ,, ,, ,, |
| Double Stretchers | 15 17 6 | ,, ,, ,, |
| Double Headers | 12 17 6 | ,, ,, ,, |
| One Side and two Ends | 16 17 6 | ,, ,, ,, |
| Two Sides and one End | 17 17 6 | ,, ,, ,, |
| Splays and Squints | 15 7 6 | ,, ,, ,, |
| Best Dipped Salt Glazed Stretchers | 10 7 6 | ,, ,, ,, |
| Headers | 9 17 6 | ,, ,, ,, |
| Quoins, Bullnose, and Flats | 13 17 6 | ,, ,, ,, |
| Double Stretchers | 15 17 6 | ,, ,, ,, |
| Double Headers | 12 17 6 | ,, ,, ,, |
| One Side and two Ends | 16 17 6 | ,, ,, ,, |
| Two Sides and one End | 17 17 6 | ,, ,, ,, |
| Splays and Squints | 15 7 6 | ,, ,, ,, |
| Second Quality White and Dipped Salt Glazed | 1 5 0 | ,, less than best. |

| | s. d. | |
|---|---|---|
| Thames and Pit Sand | 6 6 | per yard, delivered. |
| Thames Ballast | 5 0 | ,, ,, |
| Best Portland Cement | 28 0 | per ton, ,, |
| Best Ground Blue Lias Lime | 19 0 | ,, ,, |

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

| | |
|---|---|
| Grey Stone Lime | 11s. 6d. per yard, delivered. |
| Stourbridge Fireclay in sacks | 27s. 0d. per ton at rly. dpt. |

### STONE.

| | s. d. | |
|---|---|---|
| BATH STONE—delivered on road waggons, Paddington Depôt | 1 6½ | per ft. cube. |
| Do. do. delivered on road waggons, Nine Elms Depôt | 1 8½ | ,, ,, |
| PORTLAND STONE (20 ft average)— | | |
| Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf | 2 1 | ,, ,, |
| White Basebed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf | 2 2½ | ,, ,, |

| | s. d. | |
|---|---|---|
| Ancester in blocks | 1 10 | per ft. cube deld. rly. depôt |
| Beer ,, | 1 6 | ,, ,, |
| Greenshill ,, | 1 10 | ,, ,, |
| Darley Dale in blocks | 2 4 | ,, ,, |
| Red Corsehill ,, | 2 2 | ,, ,, |
| Closeburn Ree Freestone | 2 0 | ,, ,, |
| Red Mansfield ,, | 2 4 | ,, ,, |

YORK STONE—*Robin Hood Quality.*

| | s. d. | |
|---|---|---|
| Scappled random blocks | 2 10 | per ft. cube, deld. rly. dep. |
| 6 in. sawn two sides landings to sizes (under 40 ft. super.) | 2 3 | per ft. super. ,, |
| 6 in. rubbed two sides ditto, ditto | 2 6 | ,, ,, |

### STONE (*continued*).

YORK STONE—(*Robin Hood Quality*) *continued*—

| | s. d. | |
|---|---|---|
| 3 in. sawn two sides slabs (random sizes) | 0 11½ | per ft. super. e d rly dep. |
| 2 in. to 2½ in. sawn one side slabs (random sizes) | 0 7½ | ,, ,, |
| 1½ in. to 2 in. ditto, ditto | 0 6 | ,, ,, |
| HARD YORK— | | |
| Scappled random blocks | 3 0 | per ft. cube ,, |
| 6 in. sawn two sides landings to sizes (under 40 ft. super.) | 2 8 | per ft super. ,, |
| 6 in. rubbed two sides ditto | 3 0 | ,, ,, |
| 3 in. sawn two sides slabs (random sizes) | 1 2 | ,, ,, |
| 2 in. self-faced random flags | 0 5 | ,, ,, |

### SLATES.

| In. In. | £ s. d. | |
|---|---|---|
| 20×10 best blue Bangor | 13 2 6 | per 1000 of 1200 at rly. d. |
| 20×12 ,, ,, | 13 17 6 | ,, ,, |
| 20×10 first quality ,, | 13 0 0 | ,, ,, |
| 20×12 ,, ,, | 13 15 0 | ,, ,, |
| 16×8 ,, ,, | 7 5 0 | ,, ,, |
| 22×10 best blue Portmadoc | 12 12 6 | ,, ,, |
| 16×8 ,, ,, | 6 12 6 | ,, ,, |
| 20×10 best Eureka unfading green | 15 17 6 | ,, ,, |
| 20×12 ,, ,, | 18 7 6 | ,, ,, |
| 18×10 ,, ,, | 13 5 0 | ,, ,, |
| 16×8 ,, ,, | 10 5 0 | ,, ,, |
| 20×10 permanent green | 11 12 6 | ,, ,, |
| 18×10 ,, ,, | 9 12 6 | ,, ,, |
| 66×8 ,, ,, | 6 12 6 | ,, ,, |

### TILES.

| | s. d. | |
|---|---|---|
| Best plain red roofing tiles | 42 0 | per 1000, at rly depôt. |
| Hip and Valley tiles | 3 7 | per doz. ,, |
| Best Brosel y tiles | 50 0 | per 1000 ,, |
| Do. Ornamental tiles | 52 6 | ,, ,, |
| Hip and Valley tiles | 4 0 | per doz. ,, |
| Best Ruabon red, brown, or brindled do. (Edwards) | 57 6 | per 1000 ,, |
| Do. Ornamental do. | 60 0 | ,, ,, |
| Hip tiles | 4 0 | per doz. ,, |
| Valley tiles | 3 0 | ,, ,, |
| Best Red or Mottled Staffordshire do. (Peakes) | 51 9 | per 1000 ,, |
| Do. Ornamental do. | 54 6 | ,, ,, |
| Hip tiles | 4 1 | per doz. ,, |
| Valley tiles | 3 8 | ,, ,, |
| Best "Rosemary" brand plain tiles | 48 0 | per 1000 ,, |
| Best Ornamental tiles | 50 0 | ,, ,, |
| Hip tiles | 4 0 | per doz. ,, |
| Valley tiles | 3 8 | ,, ,, |
| Best "Hartshill" brand plain tiles, sand-faced | 50 0 | per 1000 ,, |
| Do. pressed | 47 6 | ,, ,, |
| Do. Ornamental do. | 50 0 | ,, ,, |
| Hip tiles | 4 0 | per doz. ,, |
| Valley tiles | 3 6 | ,, ,, |
| Staffordshire (Hanley) Reds or Brindled tiles | 42 6 | per 1000 ,, |
| Hand-made sand-faced | 45 0 | ,, ,, |
| Hip tiles | 4 0 | per doz. ,, |
| Valley tiles | 3 6 | ,, ,, |

### WOOD.

| BUILDING WOOD. | At per standard. £ s. d. | £ s. d. |
|---|---|---|
| Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in | 13 10 0 | ... 15 0 0 |
| Deals: best 3 by 9 | 13 0 0 | ... 14 0 0 |
| Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in. | 11 0 0 | ... 12 0 0 |
| Battens: best 2½ by 6 and 3 by 6 | 0 10 0 | less than 7 in. and 8 in. |
| Deals: seconds | 1 0 0 | less than best. |
| Battens: seconds | 0 10 0 | ,, |
| 2 in. by 4 in. and 2 in. by 6in | 9 0 0 | ... 10 0 0 |
| 2 in. by 4½ in. and 2 in. by 5 in. | 8 10 0 | ... 9 10 0 |
| Foreign Sawn Boards— | | |
| 1 in. and 1¼ in. by 7 in. | 0 10 0 | more than battens. |
| ¾ in. | 1 0 0 | ,, |
| Fir timber: best middling Danzig or Memel (average specification) | At per load of 50 ft. 4 10 0 | ... 5 0 0 |
| Seconds | 4 0 0 | ... 4 10 0 |
| Small timber (8 in. to 10 in.) | 3 12 6 | ... 3 15 0 |
| Small timber (6 in. to 8 in.) | 3 0 0 | ... 3 10 0 |
| Swedish balks | 2 10 0 | ... 3 0 0 |
| Pitch-pine timber (30 ft. average) | 4 0 0 | ... 4 15 0 |

| JOINERS' WOOD. | At per standard. £ s. d. | £ s. d. |
|---|---|---|
| White Sea: first yellow deals, 3 in. by 11 in. | 24 0 0 | ... 25 0 0 |
| 3 in. by 9 in. | 22 0 0 | ... 23 0 0 |
| Batten 2½ in. and 3 in. by 7 in. | 16 10 0 | ... 18 0 0 |
| White Sea: second yellow deals, 3 in. by 1 in. | 18 10 0 | ... 20 0 0 |
| 3 in. by 9 in. | 17 10 0 | ... 19 0 0 |
| Battens, 2½ in. and 3 in. by 7 in. | 13 10 0 | ... 14 10 0 |
| Third yellow deals, 3 in. by 11 in. and 9 in. | 13 10 0 | ... 15 0 0 |
| Battens, 2½ in. and 3 in. by 7 in. | 11 0 0 | ... 12 0 0 |
| Petersburg first yellow deals, 3 in. by 11 in. | 21 0 0 | ... 22 10 0 |
| Do. 3 in. by 9 in. | 18 0 0 | ... 19 10 0 |
| Battens | 13 10 0 | ... 15 0 0 |
| Petersburg second yellow deals, 3 in. by 11 in. | 16 0 0 | ... 17 0 0 |
| Do. 3 in. by 9 in. | 14 10 0 | ... 16 0 0 |
| Battens | 11 0 0 | ... 12 10 0 |
| Third yellow deals, 3 in. by 11 in. | 13 0 0 | ... 14 0 0 |
| Do. 3 in. by 9 in. | 12 10 0 | ... 14 0 0 |
| Battens | 10 0 0 | ... 11 0 0 |
| White Sea and Petersburg— | | |
| First white deals, 3 in. by 11 in. | 14 10 0 | ... 15 10 0 |
| ,, ,, 3 in. by 9 in. | 13 10 0 | ... 14 0 0 |
| Battens | 11 0 0 | ... 12 0 0 |
| Second white deals, 3 in. by 11 in. | 13 10 0 | ... 14 10 0 |
| ,, ,, 3 in. by 9 in. | 12 10 0 | ... 13 10 0 |
| Battens | 10 0 0 | ... 11 0 0 |

### WOOD (*continued*).

| | At per standard. £ | s. | d. | | £ | s. | d. |
|---|---|---|---|---|---|---|---|
| JOINERS' WOOD (*continued*)— | | | | | | | |
| Pitch-pine : deals | 18 | 0 | 0 | ... | 21 | 0 | 0 |
| Under 2 in. thick extra | 0 | 10 | 0 | ... | 1 | 0 | 0 |
| Yellow pine—First, regular sizes | 44 | 0 | 0 | upwards. | | | |
| Oddments | 32 | 0 | 0 | » | | | |
| Seconds, regular sizes | 33 | 0 | 0 | » | | | |
| Oddments | 28 | 0 | 0 | » | | | |
| Kauri Pine—Planks, per ft. cube | 0 | 3 | 6 | ... | 0 | 5 | 0 |
| Danzig and Stettin Oak logs— | | | | | | | |
| Large, per ft. cube | 0 | 3 | 0 | ... | 0 | 3 | 9 |
| Small » » | 0 | 2 | 6 | ... | 0 | 2 | 6 |
| Wainscot Oak Logs, per ft. cube | 0 | 5 | 6 | ... | 0 | 6 | 0 |
| Dry Wainscot Oak, per ft. sup. as inch | 0 | 0 | 8½ | ... | 0 | 0 | 9¼ |
| ¼ in. do. do | 0 | 0 | 7 | ... | | — | |
| Dry Mahogany—Honduras, Tabasco, per ft. super. as inch | 0 | 0 | 9 | ... | 0 | 1 | 0 |
| Selected, Figury, per ft. super. as inch | 0 | 1 | 6 | ... | 0 | 2 | 6 |
| Dry Walnut, American, per ft. super. as inch | 0 | 0 | 10 | ... | 0 | 1 | 0 |
| Teak per load | 17 | 0 | 0 | ... | 22 | 0 | 0 |
| American Whitewood Planks, per ft. cube | 0 | 4 | 0 | ... | 0 | 5 | 0 |
| Prepared Flooring, etc.— | Per square. | | | | | | |
| 1 in. by 7 in. yellow, planed and shot | 0 | 13 | 6 | ... | 0 | 17 | 0 |
| 1 in. by 7 in. yellow, planed and matched | 0 | 4 | 0 | ... | 0 | 18 | 0 |
| 1¼ in. by 7 in. yellow, planed and matched | 0 | 16 | 0 | ... | 1 | 0 | 0 |
| 1 in. by 7 in. white, planed and shot | 0 | 12 | 0 | ... | 0 | 14 | 6 |
| 1 in. by 7 in. white, planed and matched | 0 | 12 | 6 | ... | 0 | 15 | 0 |
| 1¼ in. by 7 in. white, planed and matched | 0 | 15 | 0 | ... | 0 | 16 | 6 |
| ¼ in. by 7 in. yellow matched and beaded or V-jointed brds. | 0 | 11 | 0 | ... | 0 | 13 | 6 |
| 1 in. by 7 in. » » | 0 | 14 | 0 | ... | 0 | 18 | 0 |
| ¼ in. by 7 in. white » » | 0 | 10 | 0 | ... | 0 | 11 | 6 |
| 1 in. by 7 in. » » | 0 | 12 | 9 | ... | 0 | 15 | 0 |

6 in. at 6d. to 9d. per square less than 7 in.

### JOISTS, GIRDERS, &c.

| | In London, or delivered Railway Vans, per ton. £ | s. | d. | | £ | s. | d. |
|---|---|---|---|---|---|---|---|
| Rolled Steel Joists, ordinary sections | 7 | 0 | 0 | ... | 7 | 10 | 0 |
| Compound Girders, ordinary sections | 9 | 0 | 0 | ... | 10 | 0 | 0 |
| Steel Compound Stanchions | 11 | 0 | 0 | ... | 2 | 0 | 0 |
| Angles, Tees, and Channels, ordinary sections | 9 | 0 | 0 | ... | 10 | 0 | 0 |
| Flitch Plates | 9 | 0 | 0 | ... | 9 | 10 | 0 |
| Cast Iron Columns and Stanchions including ordinary patterns | 7 | 10 | 0 | ... | 8 | 10 | 0 |

### METALS.

| | Per ton, in London. £ | s. | d. | | £ | s. | d. |
|---|---|---|---|---|---|---|---|
| IRON— | | | | | | | |
| Common Bars | 8 | 10 | 0 | ... | 9 | 0 | 0 |
| Staffordshire Crown Bars, good merchant quality | 8 | 15 | 0 | ... | 9 | 5 | 0 |
| Staffordshire "Marked Bars" | 10 | 10 | 0 | ... | | — | |
| Mild Steel Bars | 8 | 15 | 0 | ... | 9 | 5 | 0 |
| Hoop Iron, basis price | 9 | 5 | 0 | ... | 9 | 10 | 0 |
| » » Galvanised | 17 | 0 | 0 | ... | | — | |

(*And upwards, according to size and gauge.)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Sheet Iron Black— | | | | | | | |
| Ordinary sizes to 20 g. | 9 | 15 | 0 | ... | | — | |
| » » 24 g. | 10 | 15 | 0 | ... | | — | |
| » » 26 g. | 12 | 5 | 0 | ... | | — | |
| Sheet Iron, Galvanized, flat, ordinary quality— | | | | | | | |
| Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g. | 15 | 0 | 0 | ... | | — | |
| Ordinary sizes to 22 g. and 24 g. | 15 | 10 | 0 | ... | | — | |
| » » 26 g. | 18 | 10 | 0 | ... | | — | |
| Sheet Iron, Galvanized, flat, best quality— | | | | | | | |
| Ordinary sizes to 20 g. | 18 | 0 | 0 | ... | | — | |
| » » 22 g. and 24 g. | 18 | 10 | 0 | ... | | — | |
| » » 26 g. | 20 | 0 | 0 | ... | | — | |
| Galvanised Corrugated Sheets— | | | | | | | |
| Ordinary sizes, 6 ft. to 8 ft. 20 g. | 14 | 10 | 0 | ... | | — | |
| » » 22 g. and 24 g. | 4 | 15 | 0 | ... | | — | |
| » » 26 g. | 16 | 5 | 0 | ... | | — | |
| Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker | 12 | 0 | 0 | ... | | — | |
| Best Soft Steel Sheets, 22 g. & 24 g. | 13 | 0 | 0 | ... | | — | |
| » » » 26 g. | 15 | 0 | 0 | ... | | — | |
| Cut Nails, 3 in. to 6 in. | 10 | 10 | 0 | ... | 11 | 0 | 0 |

(Under 3 in., usual trade extras.)

| LEAD, &c. Per ton, in London. £ | s. | d. | | £ | s. | d. |
|---|---|---|---|---|---|---|
| LEAD—Sheet, English, 3lb. and up. | 16 | 15 | 0 | ... | | — | |
| Pipe in coils | 17 | 5 | 0 | ... | | — | |
| Soil pipe | 19 | 5 | 0 | ... | | — | |
| Compo pipe | 20 | 5 | 0 | ... | | — | |
| ZINC—Sheet— | | | | | | | |
| Vielle Montagne | 26 | 10 | 0 | ... | | — | |
| Silesian | 26 | 5 | 0 | ... | | — | |
| COPPER— | | | | | | | |
| Strong sheet per lb. | 0 | 1 | 0 | ... | | — | |
| Thin » » | 0 | 1 | 1 | ... | | — | |
| Copper nails » | 0 | 0 | 10 | ... | | — | |
| Copper wire » | 0 | 0 | 10 | ... | | — | |
| BRASS— | | | | | | | |
| Strong Sheet » | 0 | 0 | 11 | ... | | — | |
| Thin » | 0 | 1 | 0 | ... | | — | |
| TIN—English Ingots » | 0 | 1 | 5 | ... | | — | |
| SOLDER—Plumbers » | 0 | 0 | 7 | ... | | — | |
| Tinmans » | 0 | 0 | 9½ | ... | | — | |
| Blowpipe » | 0 | 1 | 0 | ... | | — | |

### ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.

| | |
|---|---|
| 15 oz. thirds | 2½d. per ft. delivered. |
| » fourths | 1½d. » » |
| 21 oz. thirds | 3d. » » |
| » fourths | 2½d. » » |
| 26 oz. thirds | 4d. » » |
| » fourths | 3d. » » |
| 32 oz. thirds | 4½d. » » |
| » fourths | 4d. » » |
| Fluted Sheet, 15 oz. | 3½d. » » |
| » 21 oz. | 4½d. » » |

### ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

| | |
|---|---|
| ⅛ Hartley's | 2½d. per ft. delivered. |
| 3/16 » | 2⅝d. » » |
| ¼ » | 2¾d. » » |
| Figured, Oxford Rolled and "Oceanic" Glass, white | 3½d. » » |
| » » tinted | 5d. » » |

### OILS, &c.

| | | £ | s. | d. |
|---|---|---|---|---|
| Raw Linseed Oil in pipes | per gallon | 0 | 1 | 11 |
| » » » in barrels | » | 0 | 2 | 0 |
| » » » in drums | » | 0 | 2 | 3 |
| Boiled » in barrels | » | 0 | 2 | 3 |
| » » » in drums | » | 0 | 2 | 6 |
| Turpentine in Barrels | » | 0 | 2 | 3 |
| » in drums | » | 0 | 2 | 5 |
| Genuine Ground English White Lead | per ton | 20 | 10 | 0 |
| Red Lead, Dry | » | 20 | 0 | 0 |
| Best Linseed Oil Putty | per cwt. | 0 | 7 | 0 |
| Stockholm Tar | per barrel | 1 | 12 | 0 |

### VARNISHES, &c. Per gallon.

| | | | |
|---|---|---|---|
| Fine Pale Oak Varnish | 0 | 8 | 0 |
| Pale Copal Oak | 0 | 10 | 6 |
| Superfine Pale Elastic Oak | 0 | 12 | 6 |
| Fine Extra Hard Church Oak | 0 | 10 | 0 |
| Superfine Hard-drying Oak, for seats of Churches | 0 | 14 | 6 |
| Fine Elastic Carriage | 0 | 12 | 0 |
| Superfine Pale Elastic Carriage | 0 | 16 | 0 |
| Fine Pale Maple | 0 | 16 | 0 |
| Finest Pale Durable Copal | 0 | 18 | 0 |
| Extra Pale French Oil | 1 | 1 | 0 |
| Eggshell Flating Varnish | 0 | 18 | 0 |
| White Pale Enamel | 1 | 4 | 0 |
| Extra Pale Paper | 0 | 12 | 0 |
| Best Japan Gold Size | 0 | 10 | 6 |
| Best Black Japan | 0 | 16 | 0 |
| Oak and Mahogany Stain | 0 | 9 | 0 |
| Brunswick Black | 0 | 8 | 0 |
| Berlin Black | 0 | 16 | 0 |
| Knotting | 0 | 10 | 9 |
| French and Brush Polish | 0 | 10 | 6 |

## PUBLISHER'S NOTICES.

**Nat. Tel., 6112 Gerrard. Telegrams, "The Builder, London."**

THE INDEX (with TITLE-PAGE) for VOLUME XCV. (July to December, 1908) was given as a supplement with the issue of January 9th.

CLOTH CASES for Binding the Numbers are now ready, price 2s. 6d. each; also

READING CASES (Cloth), with Strings, price 9d. each.

THE NINETY-FIFTH VOLUME of "The Builder" (bound), price Twelve Shillings and Sixpence.

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*** Stamps *must not* be sent; but all sums should be remitted by Postal Orders, payable to J. MORGAN, and addressed to the Publisher of "THE BUILDER," 4, Catherine Street, W.C.

Advertisements for the current week's issue are received up to ONE p.m. on THURSDAY, but "Classification" is impossible in the case of any which may reach the Office after TWELVE NOON on that day. Those intended for the Outside Wrapper should be in by TWELVE NOON on WEDNESDAY.

ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before TEN o'clock on WEDNESDAY MORNING.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, etc., left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

ADVERTISERS in "THE BUILDER" may have *Replies addressed to the Office*, 4, Catherine Street, Strand, W.C., *free of charge*. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage. Unused stamps are returned to advertisers the week after publication.

N.B.—The Reply Boxes are not intended for trade lists, circulars, and the like; should these be received, they cannot (if noticed) be forwarded.

AN EDITION Printed on THIN PAPER, for FOREIGN and COLONIAL CIRCULATION, is issued every week.

READING CASES { NINEPENCE EACH. By post (carefully packed), 1s.

## TENDERS.

*** Next week communications for insertion under this heading must reach us *not later than* 9 *a.m. on Wednesday*, as, owing to the Easter holidays, we go to press a day earlier than usual.

* Denotes *accepted*. † Denotes *provisionally accepted*.

BAWTRY (near Doncaster).—For a villa residence. Messrs. Garside & Pennington, architects and surveyors, Pontefract and Castleford :—

W. Whiting, Cottingham, near Hull* £477 0 0

BEDFORD.—For constructing a refreshment pavilion at Russell Park, for the Corporation. Mr. N. Greenshields, Borough Surveyor, Bedford :—

| | |
|---|---|
| W. Laughton | £353 10 0 |
| F. Corby, River-street* | 349 0 0 |

BRAUNTON.—For erecting a house, stabling, and outbuildings, for Mr. J. Pickard. Mr. H. W. Weir, architect and surveyor, 32, Greenclose-road, Ilfracombe :—

| | |
|---|---|
| Woolway & Son | £1,250 0 0 |
| A. Darch | 1,076 0 0 |
| W. H. Robins | 1,032 0 0 |
| Lucker Bros. | 999 15 0 |
| Slee & Son, Barnstaple* | 924 16 4 |

CLEETHORPES.—For an elementary school for infants, for Lindsey County Council Education Committee. Messrs. Scorer & Gamble, architects, Bank-street-chambers, Lincoln :—

| | | | |
|---|---|---|---|
| Sprakes & Son | £2,542 4 | W. Nicholson, Ltd. | £2,173 18 |
| Halkes Bros. | 2,480 0 | Scarborough | 2,147 8 |
| Parker & Son | 2,450 0 | Marrows | 2,128 0 |
| D. Parks & Son | 2,450 0 | Hewins & Goodhand, Grimsby* | 2,097 0 |
| H. J. Thompson | 2,324 0 | Holmes & Richardson | 2,097 0 |
| G. W. Wainer | 2,320 0 | | |
| Pattinson, Ltd. | 2,295 0 | | |

EAST FERRY (Lincs).—For building an elementary school, for Lindsey County Council Education Committee. Messrs. Scorer & Gamble, Architects, Bank-street-chambers, Lincoln :—

| | | | |
|---|---|---|---|
| T. Hickman | £703 0 0 | Scarborough | £604 16 4 |
| Nicholson, Ltd. | 681 18 0 | J. G. Cooling | 603 0 0 |
| A. J. Elmes | 625 0 0 | Kelsey | 599 0 0 |
| B. Selby | 610 0 0 | B. Pumfrey, Gainsborough* | 573 0 0 |
| F. Waite | 606 10 0 | | |
| R. W. Harpham | 606 0 0 | | |

GUILDFORD.—For the erection of a nurses' home in connexion with the Infirmary at the Union Workhouse, for the Guardians. Mr. E. L. Lunn, architect, 36, High-street, Guildford :—

W. J. Fryer & Co., Bravington Works, Paddington, London, W.‡ ..... £2,282

‡ Subject to sanction of Local Government Board.

GUNTHORPE (Lincolnshire).—For building an elementary school, for the Education Committee. Messrs. Scorer & Gamble, Architects, Bank-street Chambers, Lincoln :—

| | | | |
|---|---|---|---|
| T. Hickman | £713 0 0 | J. G. Cooling | £587 15 0 |
| Nicholson Ltd. | 664 15 10 | Kelsey | 587 0 0 |
| A. J. Elmes | 620 0 0 | B. Pumfrey | 573 0 0 |
| F. Waite | 604 10 0 | Moody Bros., West Stockwith, Gainsborough* | 570 13 2 |
| J. W. Burrell | 600 0 0 | | |
| Scarborough | 598 4 0 | | |
| F. Perks & Son | 598 0 0 | | |

HEMSWORTH.—For new road. Messrs. Garside & Pennington, surveyors, Pontefract and Castleford :—

H. Roberts, Gainsborough* ..... £296 15 2

HERNE BAY.—For sewering streets on the West Cliff, for the Urban District Council. Mr. F. W. J. Palmer, C.E., Surveyor, Town Hall, Herne Bay :—

| | | | |
|---|---|---|---|
| J. Wood | £1,437 0 0 | P. Furley | £735 0 0 |
| J. Mills | 957 0 0 | Hardy & Co. | 715 0 0 |
| Jordan Bros. | 860 1 6 | Ingleton Bros., Herne Bay* | 577 0 0 |
| L. H. Head | 823 0 0 | | |

HUDDERSFIELD.—For erecting Baptist church and school at Birkby. Messrs. Garside & Pennington, architects and surveyors, Pontefract and Castleford. Quantities by architects :—

| | |
|---|---|
| *Brick and Stone :* T. Bottomley & Sons, Huddersfield* | £2,195 0 0 |
| *Joiners :* J. & J. Wilkinson, Marsden, Huddersfield* | 780 0 0 |
| *Plumbers :* Milnes & Garside, Huddersfield* | 340 0 0 |
| *Plasterers :* Theabould & Sons, Bradford* | 31 10 0 |
| *Slater :* G. B. Tunnacliffe, Huddersfield* | 164 0 0 |
| *Painters :* G. Moxon & Son, Huddersfield* | 44 10 0 |

LLECHRYD (Wales).—For renovation of vestry-room and erection of a stable adjoining the Calvinistic Methodist Chapel. Messrs. David Davies & Son, architects, Penrhiwllan, Henllan, Cardiganshire :—

| | |
|---|---|
| Michael & George | £229 0 0 |
| J. Williams & Sons | 222 15 0 |
| Thomas & Lewis, Newcastle Emlyn* | 197 0 0 |

LONDON.—For provision of spare armature, Blackwall Tunnel, for the London County Council :—

| | |
|---|---|
| Crompton & Co., Ltd. | £252 0 0 |
| J. G. Sneath | 205 0 0 |
| Westminster Engineering Co., Ltd., Willesden Junction, N.W.* | 184 0 0 |

LONDON.—For renewal of feeder cables, Rotherhithe Tunnel, for the London County Council :—

| | |
|---|---|
| Callender's Cable & Construction Co., Ltd. | £106 3 9 |
| W. T. Glover & Co., Ltd. | 104 1 6 |
| W. T. Henley's Telegraph Works Co., Ltd., London-wall, E.C.* | 97 12 6 |

LONDON.—For repainting Westminster Bridge, for the London County Council :—

| | |
|---|---|
| A. H. Inns | £3,156 0 0 |
| A. Bagnall & Sons | 2,786 5 3 |
| W. G. Beaumont & Sons | 2,670 0 0 |
| Woollaston Bros. | 2,499 13 10 |
| W. Dudley | 2,387 8 6 |
| Vigor & Co. | 2,383 0 0 |
| J. Mowlem & Co., Ltd. | 2,322 0 0 |
| E. Proctor & Sons, Woolwich* | 2,137 6 5 |
| J. Downham | 1,822 19 1 |

[The Chief Engineer's estimate, comparable with the above tenders, is £2,500.]

LONDON.—For engineering work in connexion with reconstruction of the upper boiler house, South-Western Fever Hospital, London-road, Stockwell, for the Metropolitan Asylums Board. Mr. W. T. Hatch, M.Inst.C.E., Engineer-in-Chief :—

| | |
|---|---|
| G. Elliott & Co., Ltd. | £1,655 0 0 |
| General Iron Foundry Co., Ltd. | 1,550 0 0 |
| Gimson & Co. (Leicester), Ltd. | 1,522 0 0 |
| Cannon & Hefford | 1,495 0 0 |
| J. & F. May | 1,488 10 0 |
| Wenham & Waters, Ltd. | 1,475 0 0 |
| E. Wall | 1,425 0 0 |
| W. J. Fryer & Co. | 1,178 0 0 |
| H. Windsor & Co., 58, Oxberry-avenue, Fulham* | 1,165 0 0 |

LONDON.—For erecting two house coal stores at the Eastern Fever Hospital, Homerton Grove, E., for the Metropolitan Asylums Board. Mr. W. T. Hatch, Engineer-in-Chief:—

| | |
|---|---|
| Henry & McGibbon | £369 15 0 |
| E. W. Jacobs | 302 10 0 |
| Griggs & Sons | 280 0 0 |
| F. G. Foster | 267 0 0 |
| Vigor & Co. | 261 0 0 |
| Woollaston Bros. | 256 0 0 |
| T. Torode | 252 0 0 |
| McLaughlin & Harvey, Ltd. | 240 0 0 |
| L. Kazak | 237 0 0 |
| Mattock & Parsons | 215 0 0 |
| W. J. Fryer & Co, Bravington Works, Paddington* | 199 0 0 |

LUTON.—For renovating the Assembly Room at the Town Hall, for the Corporation:—

O. W. Dunham, Luton* ..... £34 0 0

LUTON.—For erecting school buildings on Beech Hill, Dunstable-road, for the Borough Council. Messrs. J. R. Brown & Sons, architects, Castle-street, Luton:—

W. & O. Wilkins, Watford* ..... £8,899 0 0

MAIDSTONE.—For the erection of a house near Maidstone, Kent. Mr. St. Pierre Harris, architect, 8, Laurence Pountney-hill, E.C.:—

| | | | |
|---|---|---|---|
| T. Knight | £2,930 | Friday & Ling | £2,490 |
| F. Wallis | 2,737 | W. Blay, Ltd. | 2,477 |
| Corben & Co. | 2,700 | W. Archer & Son, Gravesend‡ | 2,476 |
| Podger & Sons | 2,583 | | |

‡ Reduced and accepted.

NARBOROUGH and WHETSTONE. — For joint sewerage scheme (Contract No. 3), for Blaby Rural District Council. Mr. J. Turner, Engineer and Surveyor, Blaby-road, South Wigston:—

H. E. Buckley, Swan-arcade, Bradford* ..... £2,992 13 8

ORPINGTON (Kent).—For the erection of a pair of shops in the High-street, for Mr. St. Pierre Harris, architect and surveyor, 8, Laurence Pountney-hill, E.C., and Orpington:—

W. Owen & Sons* ..... £1,000

PRESTWICK.—For constructing 900 yds. of concrete seawall, for the Town Council. Mr. W. Cowie, Engineer, Alloway-chambers, Ayr:—

J. & D. Meihile, Main-street, Ayr.. £3,986 11 2

SHEEPRIDGE.—For the erection of a new Wesleyan Sunday School and alterations to the present chapel at Sheepridge, near Huddersfield. Messrs. Garside & Pennington, architects, Pontefract and Castleford:—

| | | | |
|---|---|---|---|
| J. Cooke | £2,300 | J. Jones | £2,021 |
| T. Shufflebotham | 2,290 | S. Heath, Besford, Stoke-on-Trent* | 1,987 |
| W. Thomas | 2,230 | | |
| T. Gallimore | 2,198 | | |

SIDCUP (Kent).—For works of under-pinning and repairs to house property. Mr. St. Pierre Harris, architect and surveyor, 8, Laurence Pountney-hill, E.C., and Orpington:—

| | | | |
|---|---|---|---|
| T. Knight | £194 | Clark & Dunham* | £149 |
| W. Champion | 164 | | |

SOUTH SHIELDS.—For making-up, etc., Grosvenor-gardens, Harton, for the Rural District Council. Mr. T. T. Bains, C.E., Council Offices, 1, The Terrace, East Boldon:—

G. E. Simpson, Newcastle-upon-Tyne*.. £251 5 0
[Surveyor's estimate, £245.]

SPENNYMOOR.—For making of streets, for the Urban District Council. Mr. C. R. Spencer, Surveyor, Council Offices, Spennymoor:—

| | | | |
|---|---|---|---|
| S. Dixon & Co. | £327 10 | G. Pickering, West Hartlepool* | £200 7 |
| J. Denham | 250 0 | | |
| G. H. Bell | 232 17 | | |

STAMFORD.—For erecting a six-roomed cottage at Hudd's Mills, Uffington-road, for the Corporation. Mr. F. R. Ryman, Borough Engineer, Town Hall, Stamford:—

| | | | |
|---|---|---|---|
| Hinson & Co. | £445 0 | R. Scholes | £432 0 |
| E. E. Howes | 440 0 | E. Ireson | 427 0 |
| J. Rouse | 439 0 | J. Peasgood | 401 10 |
| Peasgood & Son | 435 0 | J. Cook* | 396 0 |

[All of Stamford.]

SUTTON-AT-HONE (near Dartford, Kent).—For drainage work and repairs to twenty-eight houses. Mr. St. Pierre Harris, architect and surveyor, 8, Laurence Pountney-hill, E.C.:—

| | | | |
|---|---|---|---|
| W. Blay, Ltd. | £225 | M. Peaster, Swanley* | £176 |
| G. Rayner | 213 | | |

SWANSEA.—For a new block of offices in York-street, for Messrs. T. T. Pascoe. Messrs. Margrave & Peacock, architects, Metal Exchange, Swansea. Quantities by the architects:—

| | | | |
|---|---|---|---|
| Bennett Bros. | £4,876 0 | E. Turner & Sons | £4,365 0 0 |
| Lloyd Bros. | 4,603 0 | J. & D. Jones | 4,350 0 0 |
| T. Richards | 4,600 0 | Price Bros. | 4,326 1 10 |
| D. Jenkins, Ltd. | 4,500 0 | R. Lacey | 4,300 0 0 |
| G. Davies | 4,400 0 | J. & F. Weaver, Swansea* | 4,200 0 0 |
| D. Davies & Sons | 4,400 0 | | |
| D. W. Davies | 4,394 0 | | |

WALLINGFORD.—For the erection of five houses, Wantage-road. Mr. Edwin G. Hearness, architect and surveyor, Wallingford:—

| | | | |
|---|---|---|---|
| J. Bartlett | £1,250 0 | H. Bowden | £1,205 0 |
| J. Kirby | 1,249 0 | S. Robbins* | 1,100 0 |
| Bosher & Sons | 1,239 5 | | |

WALLINGFORD.—For the laying of new sewer in roadway, and drainage works to houses, Wantage-road. Mr. Edwin G. Hearness, architect and surveyor, Wallingford. Quantities by the architect and surveyor:—

S. Robbins (accepted on schedule).

WANDSWORTH.—For erecting new iron buildings, etc., at Swaffield-road, Wandsworth, S.W., for the Guardians:—

| | |
|---|---|
| W. H. Hyde & Co. | £5,161 |
| McCarthy Fitt | 4,960 |
| T. J. Hawkins & Co. | 4,720 |
| Wire-Wove Roofing Co. | 4,700 |
| General Building Co. | 4,647 |
| General Iron Foundry Co., Ltd. | 4,588 |
| W. Harbrow | 4,570 |
| E. Wall, Alice Works, Summerstown, S.W.‡ | 4,106 |

‡ Accepted subject to the sanction of the Local Government Board.

WEALDSTONE.—For main drainage works, for the Urban District Council. Mr. H. Walker, C.E., Surveyor, Council Offices, Peel-road, Wealdstone. Quantities by Surveyor:—

| | |
|---|---|
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